Routing Challenges in Wireless Sensor Network: A Review

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Abstract: The wireless sensor network consists of sensor network. The various applications in today world are providing information with the help of wireless sensor network. The wireless sensor network is auto configurable and is useful on different locations where it difficult to implement applications. The wireless senor network is important for today's world it is beneficial for many industries military, weather forecasting the review on various routing protocol is discussed.

Keyword: WSN, TWSN, CH.

I. INTRODUCTION

Wireless sensor network (WSN) is wide considered as one of the most necessary technologies for the twenty-first century. In the past decades, it has received tremendous attention from both academic and industry all over the world. WSN network is cheap network to establish capabilities. These sensor nodes communicate over short distance via a wireless medium and collaborate to accomplish a typical task, as an example, setting watching, military surveillance, and industrial process control.

To sensor node is limited, the aggregate power of the entire network is sufficient for the required mission.
Terrestrial Wireless Sensor Networks (TWSNs): Most generally the Terrestrial WSNs contains hundreds to thousands of cheap wireless sensor nodes which are installed in a specified geographical area. The deployment can be in an ad-hoc network or in pre-planned net-works based. In the case of Ad-Hoc networks, the sensor nodes can be released from plane and arbitrarily place them into the area of target. In the case of pre-planned, there are four different placements as followed, Grid, Optimal, 2 -D and 3-D placement models. Constraints.[5]Thus, the unique characteristics and constraints present many new challenges for the development and application of WSNs [1].

Clustering is particularly useful for logically separating multiple applications that perform different tasks and that are deployed in the same physical area Clustering based solutions have their own pros and cons [5]. Clusters can reduce the power consumption of a WSN, therefore increase the lifetime of the network [6]. Nodes within a cluster need only to communicate with its CH where by allowing each node to reduce its communication range [3]. This allows the spatial reuse of communication channel while reducing collisions.

Number of messages that flow through the network can be further reduced by aggregating data [3]. However, forming and maintaining clusters is a complex task and the associated communication messages may add considerable overhead. The rotation of the role of becoming a CH (e.g., to balance he workload) and handling node dynamic such as new, moving, or deteriorating nodes are among other issues that need to be addressed.

II ROUTING PROTOCOL IN WSN

1. Low-Energy Adaptive Clustering: Cluster formation can be either distributed or centralized. A key challenge in both of these approaches is the selection of the best set of CHs. The CHs can be selected based on parameters such as node ID node degree   residual energy], or probabilistically [9,] Lowest ID clustering [4], Distributed Clustering Algorithm (DCA) and Max-Min d-clustering [4] are solutions that are relatively simple to implement, yet not directly applicable to WSNs . LEACH and HEED are two distributed cluster formation solutions that achieve longer network lifetime by probabilistically selecting CHs based on residual energy of nodes and data aggregation. LEACH does not actually measure the residual energy of a node instead assumes uniform energy consumption for all the CHs.

2. Distributed Weight-based Energy-efficient Hierarchical Clustering protocol: (Nodes that are outside the i-band of any CH later join the closest CH, if it is within the o-band of that CH. FLOC forms none overlapping and

approximately equal size clusters. In ACE (Algorithm for Cluster Establishment), CHs are selected using an iterative process based on neighbourhood information. ACE clusters are more circular and has properties closer to hexagonal packing. However, iterative messages significantly increase the overhead of ACE. **3. Location based routing:** Routing on different location is called Routing decisions are not based on network addresses and routing tables; instead, messages are routed towards a destination location. With knowledge of the neighbour's location, each node can select the next hop neighbour that is closer to the destination, and thus advance towards the destination. Such as wireless ad hoc.[3]

3. Efficient Route

Sensor node deployments in sensing regions are so huge, running into hundreds or maybe thousands upon thousands sensor nodes, so it can work with maximum amount of nodes and additional must be flexible or dynamic enough to rapidly adjust to and response to changing environmental conditions or amendment to other sections of the network. Most sensor nodes may be allowed to be in sleep mode until when required re-awake again, with only a few supplying hard quality works [2].

III. CHALLENGES IN ROUTING PROTOCOL

Routing in wireless sensor network has always been a problematic issue of concern mainly due to several factors starting from unfriendly deployment conditions, network topology that change repeatedly, network failures, resource constraints at each sensor node to designing of routing protocol issues. [8] The **AODV** protocol is used to provide route to source from intermediate nodes. The AODV protocol is called on-demand algorithm.so they provide route only if it requested by node therefore they create less traffic Therefore, the implementation of routing protocols is affected by several underlying features which should be taken into consideration before any attempt at designed routing are implemented.

The following explains some of the routing protocols challenges which hinder efficient routing procedures in wireless sensor networks [2].

1. Energy Consumption

The main goal of the routing protocols is efficient delivery of information between sensor nodes and the sink. Thus, energy consumption may be a major concern in the design of routing protocol in WSNs.   Accuracy of the information content. Hence, several conventional routing metrics like the shortest path algorithm may not be appropriate. Instead, the reasons for energy consumption ought to be carefully investigated, and new novel energy-efficient routing metrics developed for WSNs [9].

Neighbourhood discovery: several routing protocols involve each node so as to exchange information between its neighbours. The information to be exchanged will differ according to the routing methods. While most geographical routing protocols involve knowledge of the locations of the neighbour nodes, a data- Gossiping is a controlled form of flooding where an event is forwarded only to a randomly selected node instead of a broadcast. In Directed Diffusion, one of the key WSN routing protocols, the sink floods the network with attribute-based queries [9]. As the query propagates through the network, routing path to the sink is established. All receiving nodes cache the query and later respond through pre-established paths if they observe matching event(s). [2].

2. Topology Design

The topology design for transmission on location change. Though these approaches work for well-defined cases, they are not capable of supporting requirements of collaborative sensor networks. Rumour Routing [4] is another class of data-centric routing protocol that makes use of agents to propagate both events and queries. It is a hybrid scheme that makes use of constrained event and query flooding. An agent is generated when an event occurs.

As the agent is forwarded, path to the event is setup and intermediate nodes cache the event details. A node querying an event generates another agent. These querying agents travel through the network and try to discover a node that knows about the event. If such a node is met, data stored in that node is used to figure out a path to the event. Rumour routing achieves significant energy saving over data and event flooding. If events are frequent, overhead of agents becomes dominant.   [10] is an extension of Rumour Routing. [2].

IV. CONCULSION

WSN applications help both civilian and military people. One major challenge is to design an efficient routing strategy. A routing protocol should be energy efficient, load balancing, fault tolerant, scalable and should provide high level of security but still it is a challenging task. One of the challenging tasks is to maintain the energy level in sensors.

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