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Minimum Broadcast Energy Conserving Protocol for Asymmetric WSN

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Abstract-Wireless sensor network is dynamic in nature, which operates in infrastructure less environment. Routing packets from source to destination is challenging task in WSN. Discovering routes in asymmetric wireless sensor network needs great effort to choose path at runtime. In asymmetric WSN finding shortest path and energy conservation is challenging task. In this paper we propose energy conserving protocol for asymmetric network. Proposed protocol finds the shortest path with minimum energy needs. The basic idea behind this work is to improve upon RP & Layhet from the state of art and achieve performance enhancement. Proposed protocol achieve better delivery rate with minimum energy for data routing

Keywords: Asymmetric Wireless sensor network, RP, Layhet, Egyhet, SME

I. INTRODUCTION

The process of route discovery in asymmetric networks is different from that in symmetric networks. Routing packet in asymmetric network may not take the same path in both back and forth direction. Finding path from base station to a node is very challenging task. When a node want find path to the base station start to broadcast to all its neighbor nodes. Rest of the nodes in the network upon receiving a packet add its node id and starts rebroadcasting other nodes in the network until it reaches to the base station. Lastly base station reply with the id's of proffered nodes to the requesting nodes

In this paper we addressed the basic problem in wireless network where the two nodes from the network may not use the same path to communicate with each other. The network in which such conditions occur are known as asymmetric wireless sensor network. Asymmetry in the network arises mainly due to noise sources near a device, energy conserving by shutting down a node etc.

Existing routing algorithms are designed for symmetric communication networks where two nodes uses same path to communicate back and forth. Even those who discussed the heterogeneous network assume that the link between nodes is symmetric. Ramasubramanian and Mosse are the first who provided the framework solution for asymmetric networks. But they have not addressed the issue of performance guarantee

In this paper, we focus on designing a shortest path minimum broadcast energy conserving protocol for asymmetric wireless sensor network.

Proposed protocol performs the selective broadcast in order to perform routing and improves the energy conservation. Proposed protocol improve upon RP, Layhet from the state of the art and achieve better delivery rate consuming minimum energy and slow sinking. It reduces the energy required for routing from source to destination in asymmetric environment.

II. RELATED WORKS

Current research on design on routing protocol assumes that the links are symmetric in nature. Asymmetric nature of links leads to the more overhead and less throughput. Current design on routing protocol in wireless network must consider the asymmetric nature of links.BRA protocol is build considering the asymmetric nature of links with building reverse path for asymmetric links. Chen et al. proposed reverse path protocol using source based routing[14]. Prohet is a reverse path protocol algorithm which suits for large and dynamic networks. A Proactive Link State protocol such as OLSR [9] having complete view of network at nodes but implement with partial view is capable of handling the asymmetric links. DSDV [10] a proactive routing protocol is better than [9] but assume that links are bidirectional and fail in asymmetric links.

Route request and route reply packets are normally used for by the reactive protocols such as AODV and DSR to discover route. In asymmetric networks, RREPs cannot be sent along the original path. AODV avoids asymmetric links in its path and DSR allow RREPs to go along separate links, which needs additional route discovery packets [13], [15] reveal that cross-layer integration and design techniques result in significant improvement in terms of energy efficiency in WSNs.[14] paper introduces a novel concept, i.e., *initiative determination* and illustrates how certain traditional networking functionalities can be jointly designed based on this concept to implement a cross-layer operation of medium access, distributed routing, and local congestion control functionalities

III.PROBLEM STATMENT

Achieving routing performance in asymmetric network is a challenging task. Several studies reveal properties of routing protocol performance evaluation with the links being symmetric. Existing methods for routing performance considering asymmetric links are taking the unidirectional reverse route mechanism to tackle asymmetric links. . In this proposed work, we implement a novel approach to routing in asymmetric sensor environment with performance enhancement. Moreover, we also propose to evaluate our proposal against various performance metrics.

IV. PROPOSED WORK

The proposed protocol has four different stages

- Initialization of network
- Asymmetric Route Discovery
- Data Routing
- Metric measure for performance

A. Methodology

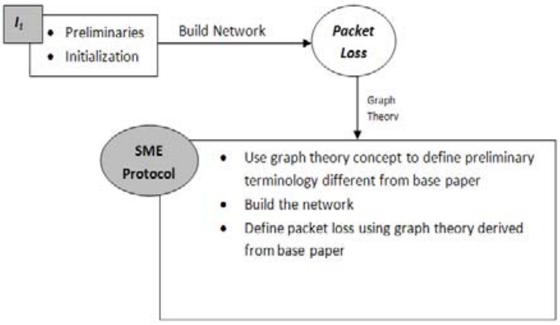

Figure1: Methodology

B. Initialization of Network

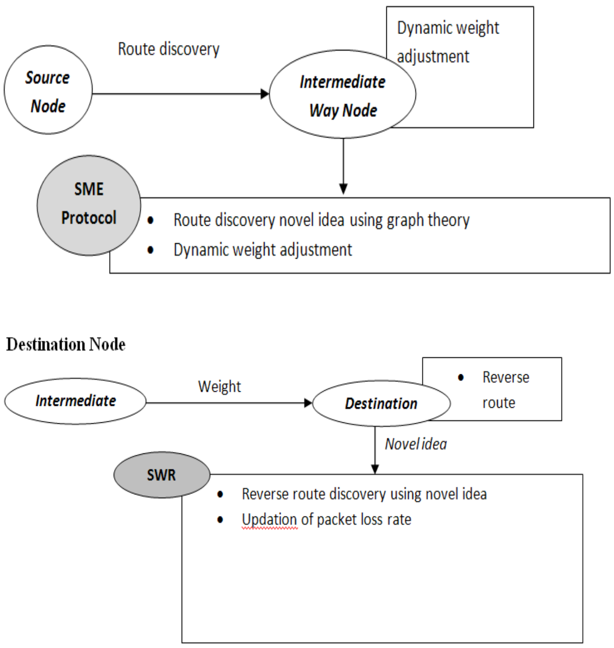

Figure 2: Initialization of Network

C. Route Disc

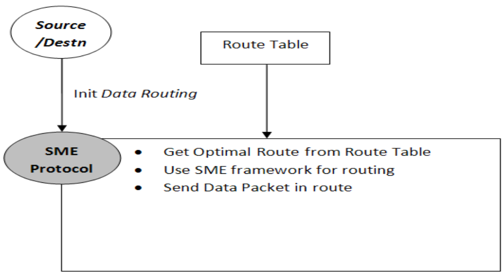

Figure 3: Route Disc

Proposed method uses reactive algorithm instead of proactive algorithm for routing packet from one node to another node. In our proposed work we present destination based routing scheme instead of using source based scheme. Also we introduce the selective broadcast scheme instead of using normal broadcast scheme

Algorithm 1:

Modified Reactive Reverse Path protocol (M $(RP)^2$) Source Node *N*, Destination node S, "Hello", "ack", Nodes: A, B …

A. Initialization of network:

a. Source to destination optimal path identification using conventional algorithms such as DVR or modified version.

b. Store optimal path info in routing table of Sink S(destination).

c. Sink selective broadcasts "hello" message to all its in-neighbors except through whom the optimal path exists.

d. All in-neighbors respond with a "hello" message.

e. If node A receives "hello" message but not the "ack" then A knows that S is it's in-neighbour.Then A will perform the next step to find a reverse routing path to S.

B. Finding Reverse route:

a. Node A tries to find a reverse routing path to each of its in-neighbors by broadcasting a ``Find" message containing the source ID (``S"), the destination ID (the ID of the in-neighbor to which it wants to find a reverse path (e.g. ``B"))

b. If some node C receives a ``Find" message, if it is the destination listed in the message, it will add the S to its out-neighbor list; increment the hop count, send the identified reverse routing path to S ``Path" message containing the reverse route.) if it is not the destination node and the hop count <= 2 it will rebroadcast the message after the following modifications:; append its own ID to the message. in all other cases, it will drop the message.

V. PRILIMINARIES

The topology of a network is a directed graph D = {V, E} where V is the set of nodes and E the set of links in the network. A link $A \rightarrow B$ exists between two nodes A and B if B is within the transmission range of A. A link $A \rightarrow B \subset E$ is bidirectional if $B \rightarrow A \subset E$ and unidirectional if $B \rightarrow A$ does not belong to E. If $A \rightarrow B$, then A is called an in-neighbor of B, and B an out-neighbor of A. The reverse route of a link *A*->B is the shortest directed path from B to A and the length of this shortest path is the reverse route length of the link. By this definition, bidirectional links have a reverse route length of one hop. If no path exists between B and A, the reverse route and the reverse route length are not defined. The network is strongly connected if every link has a reverse route.

VII. CONCLUSION AND FUTURE WORKS

We presented a shortest path Minimum Broadcast Energy conserving Protocol for Asymmetric Wireless Sensor Network. It finds the shortest path in minimum broadcasts and conserves energy in asymmetric wireless network. The basic idea behind SME is to improve upon Reverse Path (RP), Layhet, Egyhet from the state of the art and achieve performance enhancement with better delivery rate consuming minimum energy and slow sinking with reduction in energy during data routing process for data transmission to destination for the way route selected in an asymmetric environment. We are anticipating the design post experimental validation will provide a novel contribution in providing shortest path with energy conservation.

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