Enhancing Routing Techniques to Trace Efficient Transfer Links in Network: A Review

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Abstract

The use of real-time applications over wireless networks force on service providers to operate breaches-free networks. Modern routing techniques need to maintain a very high level of service availability, manageability and acceptability. A wireless sensor network typically consists of a large number of multifunctional wireless sensor nodes with sensing, wireless communications and computation capabilities. Routing in WSN is very challenging due to large number of sensor nodes are deployed in an ad hoc manner. With these nodes it is not possible to make a global addressing scheme as the overhead of ID maintenance is high. In this paper we presents routing techniques to trace fast and reliable shortest path from source to destination without losing the packets. As the topology changes, link failure between the nodes takes place due to several reasons like channel interference and dynamic obstacles etc that give rise to severe performance degradation. In AODV, the link failure is overcome by re-routing from the source node. The discovery and maintenance of route should consume minimum overhead and bandwidth. In this paper, we introduce Enhanced Local Rerouting (ELRR) algorithm that will adapt quickly alternate shortest path in case of link failure. The proposed work is an efficient and improved technique for WSN that utilizes local rerouting algorithms. All the simulations of the proposed idea will be simulated on Berkeley's ns2 network simulator.

Keywords – wireless sensor networks, network topology, AODV routing protocols, convergence phase

I. INTRODUCTION

Wireless sensor network is a dynamically self-organizing network without any central administrator or infrastructure support. The nodes which are in radio range of each other can communicate directly. If two nodes are not within the transmission range of each other, other nodes are needed to serve as intermediate routers for the communication between the two nodes to route their packets. Routing in WSN is very challenging due to large number of sensor nodes are deployed in an ad hoc manner. With these nodes it is not possible to make a global addressing scheme for the deployment of a large number of sensor nodes as the overhead of ID maintenance is high. WSNs can be widely used to perform military tracking and surveillance, natural disaster relief, hazardous environment exploration and health monitoring etc.

There are various routing protocol used in wireless sensor network for routing purpose and they have their own advantages and disadvantages. Routing protocol in WSN is categorized into three types like as proactive type, reactive type, and hybrid type. Proactive routing protocols also called table-driven routing protocol like DSDV demand that each sensor node should have whole routing information of all nodes in the network. Reactive protocols like AODV and DSR do not maintain route information in advance, this will creates a route only when there is a need that's why it is called on-demand routing protocol.

Wireless Sensor Network is one promising application on wireless ad hoc networks. The use of real-time applications over wireless networks force on service providers to operate disrupt-free networks. Breaches in service availability are generally due to side effects of network topological changes such as link failure. As the topology changes, link failure between the nodes takes place due to several reasons like channel interference and dynamic obstacles etc that give rise to severe performance degradation. Two nodes are communicating with each other through shortest path in between if any intermediate link failure occure then packets will drop. Routing protocol will enter a convergence phase during which transient forwarding loops may occur. Such loops increase the network instability and cause packet losses. During this transient state, the network service would suffer serious deterioration in quality or breakdown completely. To overcome this situation one possible solution on link failure is that rerouting the packets through alternate path and at the same time recover the previous path from failure.

Based on the study of various routing protocols in wireless sensor network, in this paper we introduce reactive type like AODV routing protocol for data transfer. In AODV, the link failure is overcome by re-routing from the source node but it has some drawbacks that it is a time consuming process that increases the overhead of all nodes which is involved in the communication. In order to overcome such performance related issues, we developed the Enhanced Local Rerouting algorithm (ELRR) for Ad hoc networks that establishes altenate path at the point of link breakage. In such cases, a reliable convergence from link failure is the main criteria that will determine the performance of the network in terms of Quality of Service (QoS).That's why we use Enhanced Local Rerouting techniques which is enhanced over AODV rerouting techniques.

II. LITERATURE REVIEW

In [1], the author propose and evaluate an efficient algorithm aimed at avoiding such traffic disruptions without modifying these IGPs. In case of an intentional modification of the weight of a link (e.g., to shut it down for maintenance operations or to perform traffic engineering), Greedy Sequential Walk (GSW) algorithm iteratively changes this weight, splitting the modification into a sequence of loop-free transitions. The number of weight increments that need to be applied on the link to reach its target state is minimized in order to remain usable in existing networks.

In [2], this paper provides the more general problem of gracefully modifying the state of an entire node, while minimizing the induced operational impact. As opposed to the single link-state modification problem, this problem is k-dimensional for a node of degree k. We show that the interplay between operations applied at the node granularity can lead to loops that do not occur in the single-link modification problem. Technique is used as it computes sequences of weight to be configured on the links of the updated node by using Greedy backword algorithm.

In [3], this paper present a comprehensive survey of improving convergence speed and scalability in OSPF. However, nowadays routing infrastructures increasingly include *wireless* components as well.

In [4], this paper the author propose a novel approach named Curved Stick (CS) that exploits GF technique and guarantees at the same time packet delivery (handles the local minimum situations). His approach is of a local nature that does not retain memories and performs better than the state-of-the-art approaches in terms of its ability to guarantee packet delivery and to derive efficient routing paths in wireless sensor network.

In WSN, the sensor nodes have a limited transmission range, and their processing and storage capabilities as well as their energy resources are also limited. Routing protocols for wireless sensor networks are responsible for maintaining the routes in the network and have to ensure reliable multi-hop communication under these conditions. In [5], this paper the author gives a survey of routing protocols for Wireless Sensor Network and compare their strengths and limitations.

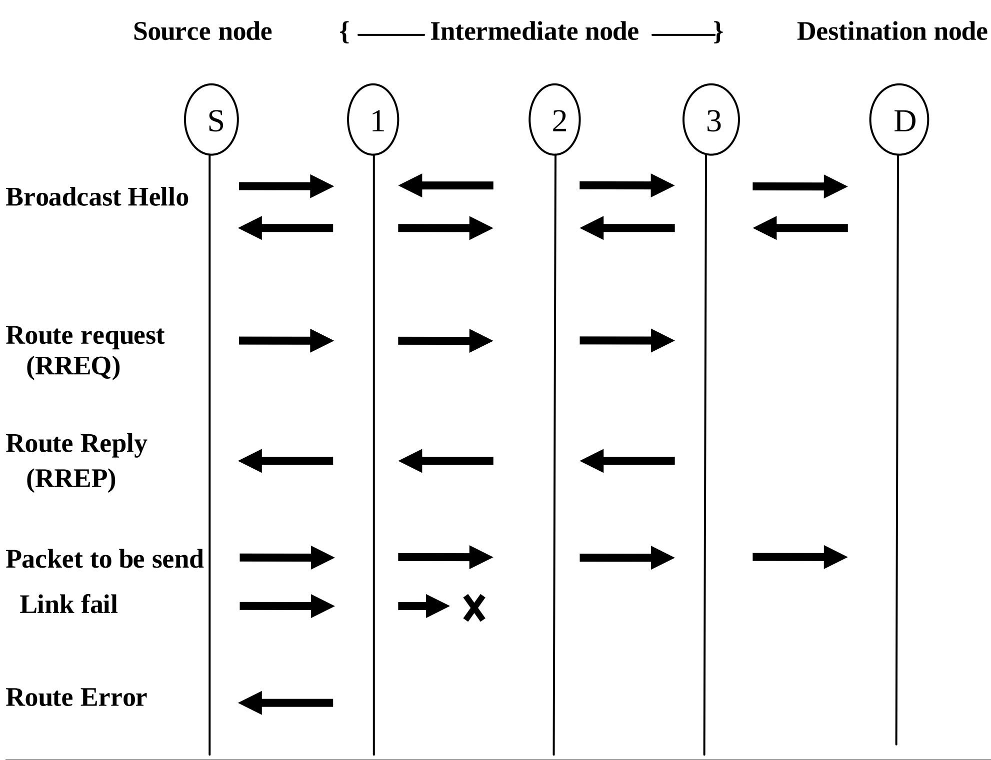
In [6] this paper the author represents a survey of performance based secure routing techniques in MANET. The security techniques are categorized based upon different approaches. The security type is borrowed from intrusion detection as either misuse detection or anomaly detection. This paper provides the major improvement in the secure techniques in MANET research using these approaches the features and categories in the surveyed work.

In [7] this paper the author proposes scheme for Self-Organization Management Protocols of higher-level nodes to contest member nodes with multi-hop form clusters, introduce the “20/80 Rule” for determining the ratio of headers to member nodes. This study implements the proposed management protocols including Clustering Mechanism for constructing cluster headers to solve the problems of clustering and broadcast storm, the suitable protocol to provide low cost communications between clusters. The Location information of the sensor nodes will be collected from source and the cluster heads were elected/selected based on the locations of the active sensor nodes in network. For selecting a cluster head, k-means algorithm will be used to find the cluster center. The nearby sensor nodes of a clusterhead then will forward their data to sink only via the cluster-head. For hop to hop packet forwarding, AODV or DSDV protocol may be used at Network Layer Protocol. That is to forward a packet from a sensor node to a cluster-head or cluster head to sink; normal routing protocols may be used.

III. AODV PROTOCOL OVERVIEW

Ad hoc On-demand Distance Vector, (AODV) is a reactive routing protocol used in wireless networks that finds a route to destination on demand. AODV requires each node to maintain a routing table containing the discovered path information. It maintains these routes as long as they are needed by the sources. AODV is capable of creating new routes whenever a route error occurs. The advantages of AODV is that, it uses sequence numbers to determine the freshness of the route thereby preventing formation of loop and doesn’t create overhead unnecessarily during communication.

The AODV protocol uses *route request* (RREQ) messages flooded through the network in order to discover the paths required by a source node. An intermediate node that receives a RREQ replies to it using a *route reply* message only if it has a route to the destination whose corresponding destination sequence number is greater or equal to the one contained in the RREQ. The RREQ also contains the most recent sequence number for the destination of which the source node is aware. A node receiving the RREQ may send a route reply (RREP) if it is either the destination or if it has a route to the destination with corresponding sequence number greater than or equal to that contained in the RREQ. If this is the case, it unicasts a RREP back to the source. Otherwise, it rebroadcasts the RREQ. Nodes keep track of the RREQ's source IP address and broadcast ID. If they receive a RREQ which they have already processed, they discard the RREQ and do not forward it. As the RREP propagates back to the source nodes set up forward pointers to the destination. Once the source node receives the RREP, it may begin to forward data packets to the destination. If the source later receives a RREP containing a greater sequence number or contains the same sequence number with a smaller hop count, it may update its routing information for that destination and begin using the better route. As long as the route remains active, it will continue to be maintained. A route is considered active as long as there are data packets periodically traveling from the source to the destination along that path. Once the source stops sending data packets, the links will time out and eventually be deleted from the intermediate node routing tables. If a link break occurs while the route is active, the node upstream of the break propagates a route error (RERR) message to the source node to inform it of the now unreachable destination(s).



(RERR)

Fig.1. AODV Protocol Communication

IV. EXISTING SYSTEM

In the current system the functionality is that they have used a AODV protocol for rerouting purpose in case of link failure. In existing system if link fails then AODV will discard the whole selected route and choose the new alternate route. The main drawback of this system is that this is time consuming process and also increase the overhead of each node that belongs in the path. In case of the existing techniques once the link failure occurs, the intermediate node will send the route error message to the source node and again initiates the route discovery process for the same data packet reducing the performance of the network. The overhead on each node is gradually increased due to transmission of RERR packet to source node.

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V. PROPOSED WORK

In this paper we use AODV routing protocol for communication between sensor nodes in wireless sensor network in which it will discover shortest path from source to destination. In case of link failure, Enhanced Local Reouting (ELRR) techniques apply only at the point of link breakage. This rerouting technique will not only reroute the packets through alternate shortest path but also convergence link from failure. . In this it will use Dijkshtra's shortest path algorithm for choosing alternate shortest path. By using this technique it will reduce the overhead of source node due to non transmission of RERR packet to source node in case of link failure. In this technique, if link is broken down then only the node where packets drop will get RERR and at that time ELRR algorithm will apply only on this node to choose alternate route and also link failure recovery mechanism will recover the broken link. The ELRR algorithm implemented with AODV routing protocol. The schematic representation of ELRR is given in **fig.2.**

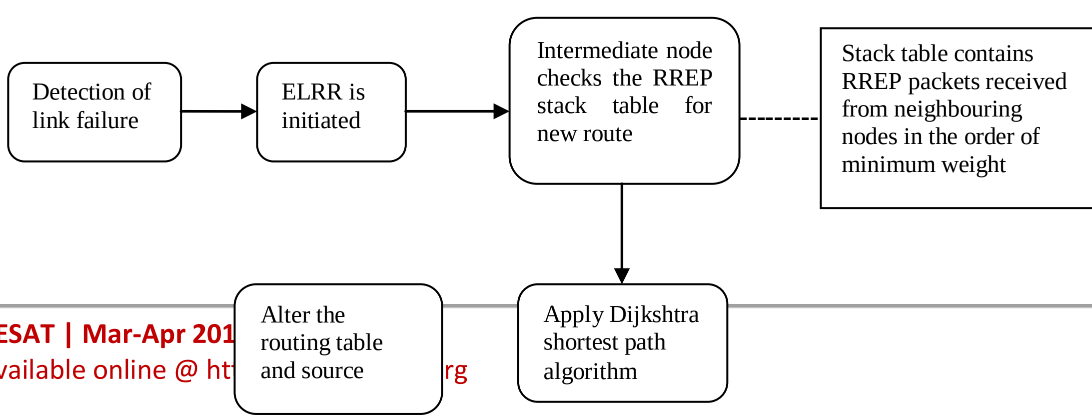

Fig.2. ELRR model

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VI. CONCLUSION

In this paper presents AODV routing protocol with Enhanced Local Reroute (ELRR) algorithm. The proposed work is enhancement over simple AODV in terms of packet delivery ratio, routing overhead , end to end delay and found significantly better in all aspects. This paper presents dijkstra's shortest path finding algorithms so that it chooses shortest new path in case of link failure. ELRR algorithm choose alternate shortest path and sending data packets without lossing also avoid formation of loop. Proposed work reduces the overhead of source nodes.

VII. REFERENCES

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