International Journal of Wireless Networks and Communications.
ISSN 0975-6507 Volume 7, Number 1 (2015), pp. 25-32

http://www.irphouse.com

Sparse Data Transmission In AOMDV Using ARS Algorithm

[1]Ms.A.Rajadurgadevi, [2]Mrs.S.Janani
[1]PG Scholar, Department of ECE, A.V.C College of Engineering, Mannampandal. Nagapattinam (Dt), India
[2]Assisstant Professor, Department of ECE, A.V.C College of Engineering, Mannampandal, Nagapattinam (Dt), India

Abstract

Our paper proposes the efficient data transmission using AOMDV protocol. The wireless sensor network based data transmission can effectively transmit data to different nodes. In order to reduce data loss and to provide fast data transmission. By using AOMDV and CS techniques. Link failures are one of major issue in the networking area. So that wireless information communication is the most promising and complicated field. As wireless mesh networks are concerned these provides larger coverage's and high data rate information transfer. Even though they provide lot of benefits to the users and several high range applications they still suffer from the occurrences of the link failure. These link failures will occur due to some interferences, overhead etc. By this link failure the information transfer can be lost so the quality of communication cannot be achieved and also the performance of this Wireless Mesh Networks can low. So in order to recover from the link failures Autonomous Reconfiguration System is used. These overall process are shown and simulated using the software called Network Simulator -2 (NS-2).

Index Terms: CS technique, AOMDV protocol, ARS Algorithm.

Introduction

Wireless mesh networks are boon to the wireless architecture. It supports larger applications and it provides several benefits to users such as, no cabling cost, automatic connection to all nodes, network flexibility, ease of installation and it also discovers new routes automatically. These wireless mesh networks are not stand alone it is compatible and interoperable with other wireless networks. It provides greater

range of data transfer rates. Wireless mesh networks are preferable compared to the adhoc networks for the easy of network maintenance, robustness etc.

In Wireless Sensor Network the sensor nodes can transmit the data from one node to another node in the network. Thus in order to transmit the data effectively by using some methods and routing protocols to reduce the data transmissions and data loss. The data to be transmitted through multi-hop routing from source node to sink node (destination) in the wireless networks.

In the existing system AODV protocol was used. Adhoc On-demand Distance Vector routing protocol is a routing protocol. All the routes are to be discovered only it is to be needed; routes are discovered through the route discovery cycle. When a node has a route to the destination node, that route is reported to the source node for further operations.

In the proposed system AOMDV protocol and CS technique are used. It is mainly used for multi-hop routing, reduces the number of data transmission and data loss. AOMDV is an extension to the AODV protocol for multi loop- free and link disjoint paths. A CS technique is to minimize number of samples captured rather than on minimize the cost of each measurement.

In this paper, the link failure occurring at the wireless mesh networks have been considered. Generally link failure is one of the major issues which took place in the networking arena. So, different kinds of approaches or algorithms are used to recover these problems. The main task which is carried out in this paper is to recover from link failure is based on the group formation of nodes from the failure occurred node. These group formation based approach will tend to some problems high delay, lesser throughput etc. In order to overcome the limitations of the ARS another approach is used which is called as Autonomous Reconfiguration Algorithm have been used. By using ARS algorithm we can automatically detect and correct the link failure.

AOMDV Protocol

Our objective in this section is to extend the AODV protocol to compute multiple disjoint loop-free paths in a route discovery. We assume that every node has a unique identifier (UID) (e.g., IP address), a typical assumption with ad hoc routing protocols. For simplicity, we also assume that all links are bidirectional, that is, a link exists between a node *i* to *j* if and only if there is a link from *j* to *i*. AOMDV can be applied even in the presence of unidirectional links with additional techniques to help discover bidirectional paths in such scenarios. It has some constraints, they are

1. Multiple extension to a well studied single path routing protocol known as AODV
2. It also reduces packet loss up to 40%
3. Also reduces overhead by 30%
4. It also improves signal strength.

Compressive Techniques (CS)

Compressive sensing (also known as compressed sensing, compressive sampling, or sparse sampling) is a signal processing technique for efficiently acquiring and reconstructing a signal, by finding solutions to underdetermined linear systems. CS techniques are used to improve the throughput, lifetime, delay of the wireless sensor network. Normally in WSN the goal is to obtain more amount of information with little amount of energy. Compressed Sensing or Compressive Sensing (CS) is about acquiring and recovering a sparse signal in the most efficient way possible with the help of an incoherent projecting basis.

1. The signal needs to be sparse
2. The technique acquires as few samples as possible
3. Later, the original sparse signal can be recovered
4. This done with the help of an incoherent projecting basis.

The compression ratio is to be defined as

Compression ratio = (1- Compressed data)
Original data

Cluster Communication

In this CS techniques there are two levels of communication i.e., inter -cluster communication and intra-cluster communication. In inter-cluster communication between the cluster we have to transmit the data's or packets of information .CS techniques is not used in inter-cluster communication. But in intra-cluster communication we have to transmit the data's or packet of information within the cluster. In this type we don't use CS techniques.

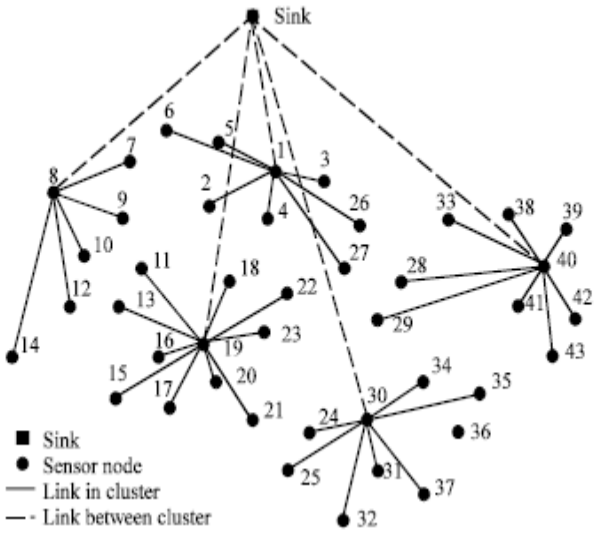

Figure 1: Cluster Communication

ARS Algorithm

During data transmission between the nodes link failure will occur due to some congestion, cross talk etc. so we have to avoid that by using ARS algorithm. ARS algorithm can detect and correct the error automatically. The operations performed in this ARS algorithm are,

- Link Monitoring
- Link Failure detection
- Reconfiguration period

A. Link Monitoring:

Monitoring is an important phenomenon when we consider the link failure. Generally monitoring is the basic operation involved in many link recovery algorithms . Monitoring period is used to monitor the links from which the information is started to the end of that period. In mesh networks it is easier to choose the alternate path when the link failure occurs. Here, since the mesh networks are used there is some general criteria should be met, there should be connectivity between all nodes in the mesh network. These connectivity can be ensured by transmitting test messages to all the nodes from source node. The source node is selected and the information transmitted to destination. Finally the monitoring period is used to detect the link failure and to measure the quality of the links by using hybrid link measurement technique.

B. Link Failure Detection:

After this link monitoring, the failure links are detected. Due to this link failure the packet dropping occurs. These packet loss occurred not only for link failure even they occur if the traffic exhibits some congestion, then to recover from this failure here no group formation based approach is used because these produces drawbacks such as high drop, low throughput etc..

C. Reconfiguration Period:

In this period some modifications to links are included. If a failure occurs to a link then there will be loss of information. By using reconfiguration plan send to the leader node the changes to node are made. So that the changes are made to the links. The most important task carried out in this period is the changes must be made to link. In this proposed algorithm, the group formation is removed and also traffic has increased. Because by removing these group formation the overheads such as high drop, low throughput will be overcome. Here the link recovery is based on the highest energy which is at the path in nearby distance.

Generally if the link failure occurred means the alternative path will be provided from the source node and also the failure information will be send to all the nodes where as in this ARS, the failure link information will be send to only the nearby nodes based on nearby path the information will be transferred. The selecting best path is based on distance. These are the operations involved in the planning period. Then finally, the information transfer took place via the nearby nodes to the destination this transmission will be done at the reconfiguration period.

Results and Analysis

We will use NS-2. NS-2 is a discrete event simulator (timing of events is maintained in a scheduler).It was normally used in wired & wireless protocol. It can be written in C++ and OTcl.

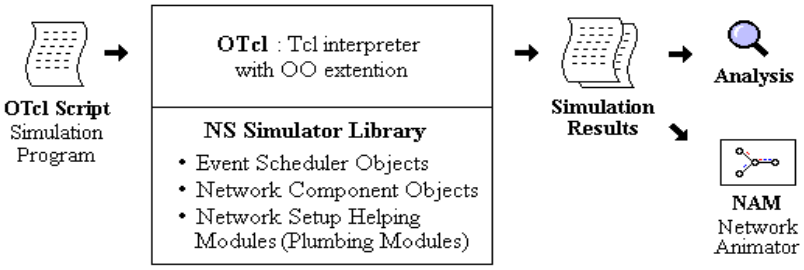

Figure 3: NS-2 Operations

Link Monitor

In this we will monitor the data transmission there are some congestion occur.

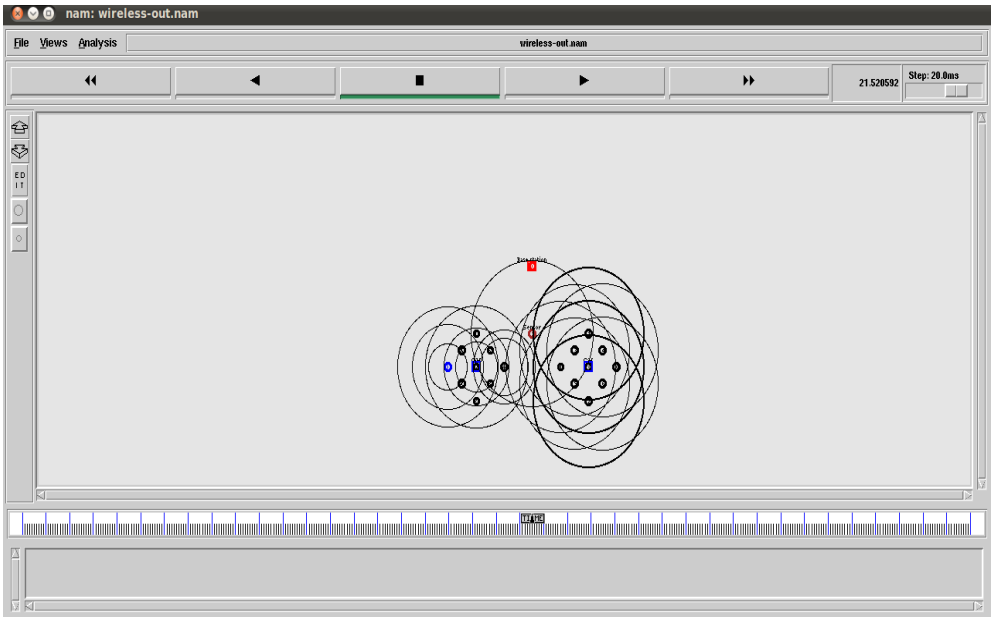

Fig 4: Congestion

Failure Detection

In this window detect the failure node by link monitoring

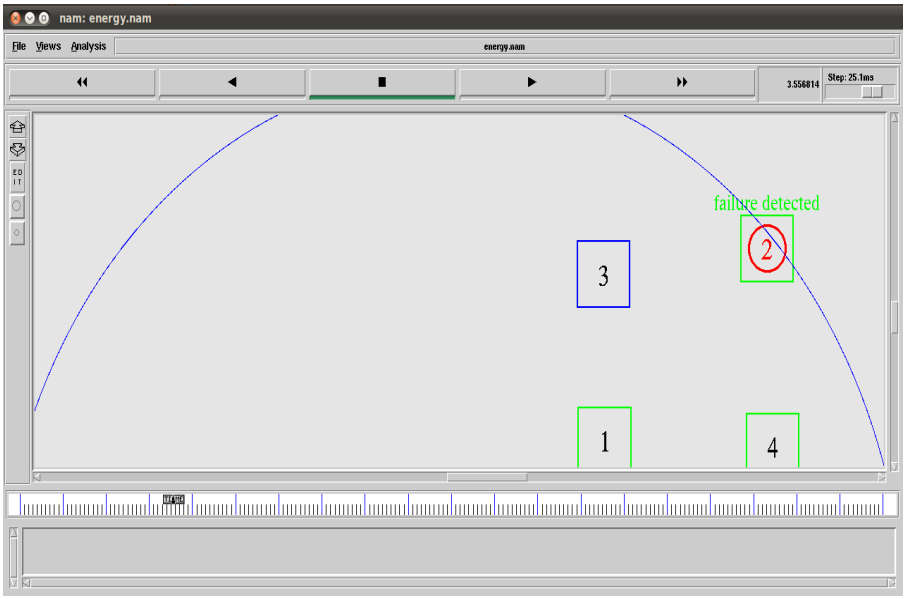

Figure 5: Failure detected

Enable ARS algorithm

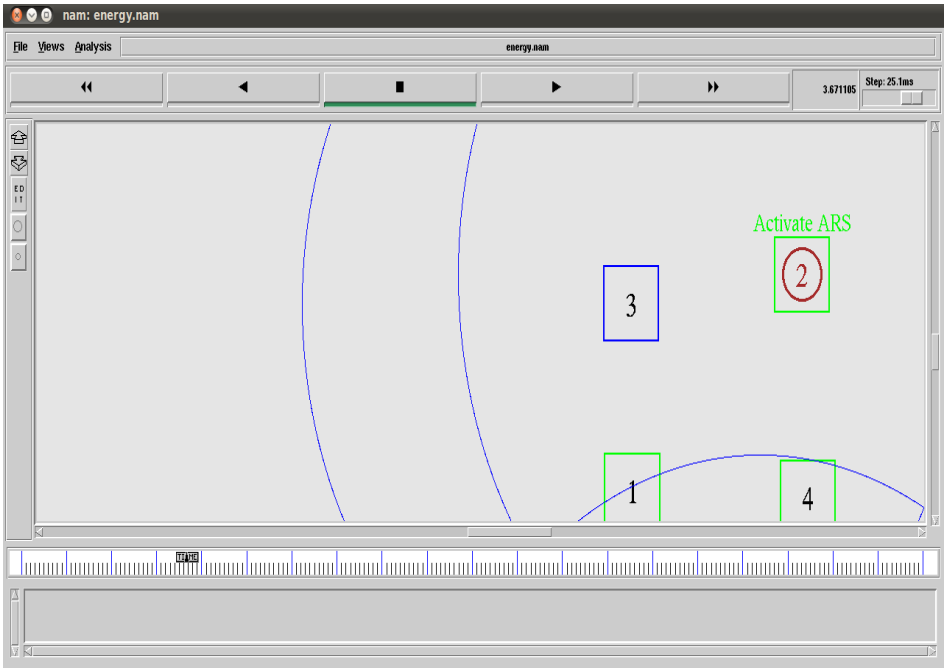

Figure 6: Enable ARS

Reconfigure The Failure Node

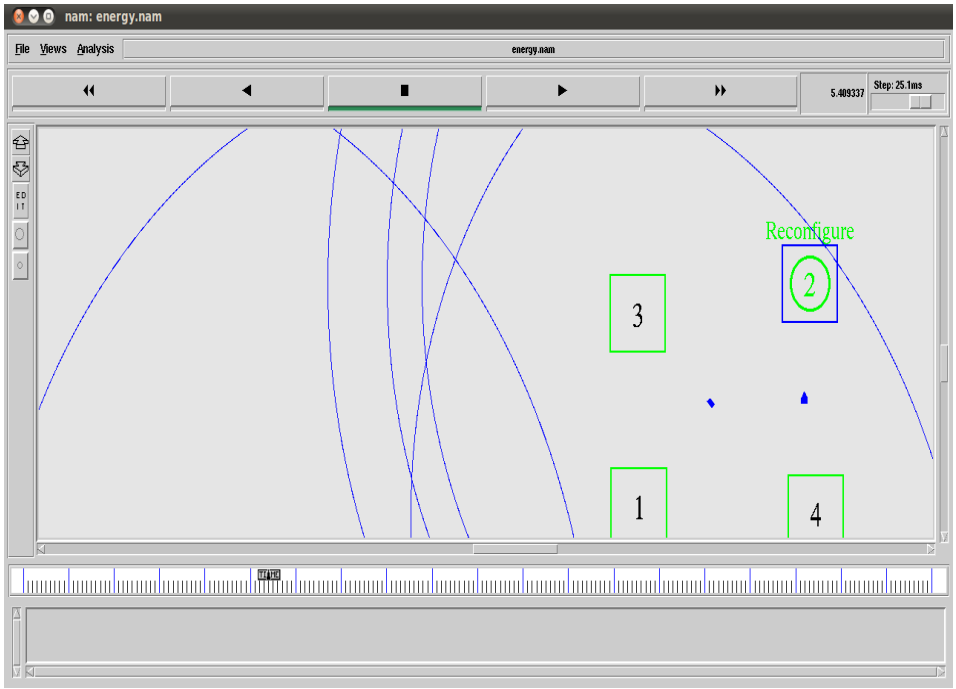

Figure 7: Reconfiguration

Conclusion

In this paper, the automatic link failure detection and correction is done by using Autonomous Reconfigurable System algorithm. And it also improves the signal strength by using AOMDV protocol. So the quality of data transmission will be higher.

References

[1] Y. Liu, Y. He, M. Li, J. Wang, K. Liu, L. Mo, W. Dong, Z. Yang, M. Xi, J. Zhao *et al.*, "Does wireless sensor network scale? a measurement study on greenorbs," in *Proceedings IEEE INFOCOM*. IEEE, 2011, pp. 873–881.

[2] C. Chou, R. Rana, and W. Hu, "Energy efficient information collection in wireless sensor networks using adaptive compressive sensing," in *IEEE 34th Conference on Local Computer Networks, 2009*. IEEE, 2009, pp. 443–450.

[3] C. W. Chen and Y. Wang. Chain-type wireless sensor network for monitoring long range infrastructures: architecture and protocols. *International Journal on Distributed Sensor Networks*, 4(4), Oct. 2008.

[4] E. J. Cand`es and M. B. Wakin. An introduction to compressive sampling. *IEEE Signal Processing Magazine*, 25(2):21–30, Mar. 2008.

[5] "Joint disjoint path routing and channel assignment in Multi-radio Multi-channel Wireless Mesh Networks,, 2008 IEEE.

[6] "Link Failure Rate and Speed of Nodes in Wireless Network", Xiao Shu, Xining Li, Computing and Information Science University of Guelph, Canada, 2007.

[7] K. Ramanchandran, E. Belding-Royer, and M. Buddhikot, "Interference aware channel assignment in multi-radio wireless mesh networks," in Proc. IEEE INFOCOM, Barcelona, Spain, Apr. 2006, pp. 1–12.

[8] R. Draves, J. Padhye, and B. Zill, "Routing in multi-radio, multi-hop wireless mesh networks," in Proc. ACM MobiCom, Philadelphia, PA, Sep. 2004, pp. 114–128.

[9] Corson MS, Ephremides A. A distributed routing algorithm for mobile wireless networks. *Wireless Networks* 1995; **1**(1): 61–81.