International Innovative Research Journal of Engineering and Technology
Melange Publications ISSN NO:2456-1983

A Survey on Energy Utilization in Wireless Adhoc Network

Dr. S.K. MANJU BARGAVI[1]
Department of Computer Science, Eritrea Institute of Technology
Asmara, Eritrea
[1]cloudbargavi@gmail.com

Abstract:
Wireless Ad-hoc networks have been broadly examined for many years. Wireless Ad-hoc networks are a collection of devices equipped with wireless communications and networking capability. It's also non-infrastructure networks which consist of mobile nodes. Since the mobile nodes have limited battery power, it 's extremely vital to make use of power proficiently in ad-hoc networks. In order to maximize the lifetime of ad hoc networks, transfer must be alive send through a path to be able to be let alone node with low energy which minimizing the total transmission power. In this paper analysis the energy utilization in wireless ad-hoc network with efficient and different perspective.
Keywords: Ad-hoc networks, Battery, Energy, Lifetime, Traffic.

I. Introduction

An ad hoc network is an unpredictable network topology, node placement, mobility etc., It does not rely on fixed infrastructure, unstable communication environment. Its having limited power and wireless resources. Individual nodes are responsible for dynamically establishing which other nodes they can directly communicate with it. A key hypothesis is that not all nodes can directly communication with each other, so nodes are required to relay packets on position of other nodes in order to deliver data across the network. The feature of ad hoc network is that rapid change in connection and links character are introduce due to node mobility and power control practices. Its communication environment is completely different from fixed line communication as described in Table1. Every node in our wireless home network scenario shown in Figure 1 has routing functions. No coordinating or central device is needed. The network must be self organizing and act like a mesh network. This scenario is not limited to one household. It can be expanded in real world as described in (Jan 2008). Wireless ad hoc networking is a multi-layer problem. The first (physical) layers should adapts to quick change in links character. The MAC layer needs to minimize collisions, allow fair access, half -reliable transporting datas in excess of the common wireles link in the presence of rapid changes and hidden or exposed terminal. The networks coat need to decide and deal out information used to calculate path in the technique that maintain competence when link changes often and bandwidth is at a premium. It also needs to integrate smooth by means of tradition, not an adhoc alert internetwork and perform functions such auto-configuration in this changing environment. The transport layer must be able to handle delay and packet loss statistics that are very different that hyper network. lastly, application want to be desig to lever frequent disconnection

Table 1-
Difference between Cellular network and ad hoc network[1]

Cellular network	Adhoc Network
Fixed, pre-located cell sit and base stations	No fixed based stations, va rapid deployment
Static backbone netwo topology	Highly dynamic network topologies with multi-hop
Relatively gen environment and stab connectivity	Hostile environment (loss noise) sporadic connectivity
Detailed preparati previous to bottom station able to be install	Ad hoc network automatical forms and adapts to changes

and reconnection with peer application along with wide vary holdup and packets loss characteristics [1]. Additionally, all network protocol development require to put together smooth with tradition networks and take into account possible security problems. Each wireless devices had limited battery power. Without battery, in wireless devices cannot possible to transfer and receive the data from other devices. Energy consumption in wireless ad hoc network is most important.

II.Fundamental Challenges in Wireless Ad-hoc network

In general, wireless ad hoc networks are formed dynamically by an autonomous system of mobile nodes that connected via wireless link with no by means of the exist networks infrastructures or centralized administration. The nodes are free to move erratically and systematize them randomly. The network wireless topology may change rapidly and unpredictable. Like that a networks might operates in a separate fashions, otherwise might be connected to the larger Internet.

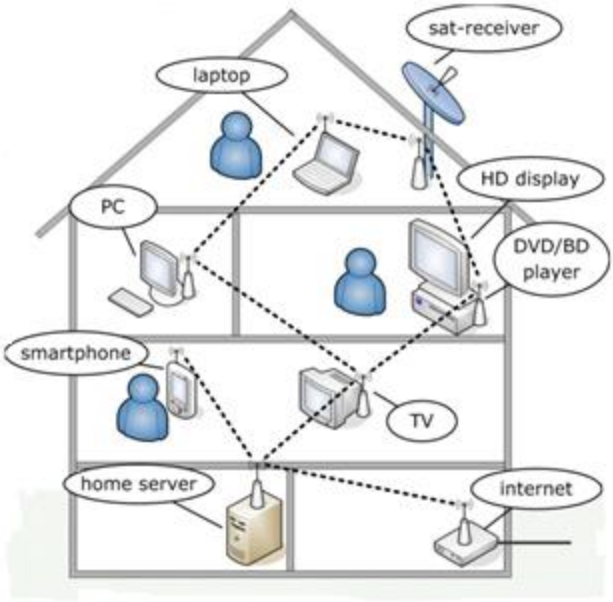

Fig. 1 Wireless home network consisting of input, output and storage devices[2].

MANET's are infrastructure-less network because they don't need some preset infrastructures such as a base station, for their operation. In general route among node in an adhoc networks might includes many hops, and hence it is appropriate to call such networks as 'more-hop wire less adhoc network'. every nodes resolve be able to communicate directly with any other node that reside inside it's broadcast range. For communicating with nodes that reside beyond this range. For communication with node that resides further than this series, the knob need to use intermediate nodes to relay the message hop by hop described in (Imrich et al 2003). The wireless medium has neither absolute, nor readily observable boundaries outside of station are identified to be incapable to be given networks frame. Each node operates in distributed point-to-point modes, act as an self-determining routers and generate dependent datas. The management of network has to distributed across different nodes. In multi-hop routing, every node acts as a router and forwards each other's packet to facilitate informations distribution among mobile host. No default router in this kind of network. Each node may be prepared with solitary or more broadcasting interface that contain changeable transmissions/receiving capabilities and operate difference frequency bands. The important challenging in wireless ad hoc network is dynamically changing network topology, because nodes can move arbitrarily and energy consumption because each node is acting as both an end system and a router at the same time. In this situation, it needs an extra energy is required to forward packets from other nodes. Saving energy and bandwidth utilization are not synonymous. The relationship between transmit speed and overall saving energy is complex. Ad hoc mode operation conjunct with the base station [5].

III.Energy Consumption Approaches in wireless ad hoc network

Communication in wireless ad hoc networks necessarily consumes the batteries of the contributing nodes, and eventually results in the breakdown of nodes due to lack of energy. Since the goal of an ad hoc network is to support some desired communication, energy conservation techniques must consider the impact of specific node failures on effective communication in the network and life time of the nodes [4]. Energy consumption can be achieved in two ways. The first way in active communication between the nodes and second is idle times in the communication. On demand routing protocols such as AODV typically pick the shortest path route during the route discovery process, until it breaks. The energy-aware routing depends on the metric are, packet delivery fraction, end-to-end delay, normalized routing load and batter energy as described[6]. The network longevity was the overall goal in reducing the batter consumption. In this algorithm approach of a class of flow augmentation algorithms coupled with flow redirection was used as described [9].The model of the energy consumption as $\alpha + \beta d^n$, where α is the distance independent, and βd^n is the distance dependent term. The coefficient n represents the path loss and typically between 2 and 6 as in [8]. The use of two hops is profitable when the reduced distance dependent consumption is higher than the fixed cost associated to the inclusion of an additional hop as described[7].

IV.PNCC

In wireless ad hoc network modeled as a graph G (V, E) with the vertices V representing network nodes, and the edges E representing communication links. Wireless ad hoc network topology with more number of nodes and Enhanced Receiver Centric Interference Model(ERCIM) with proposed nearest component connector algorithm which asymptotically matches the lower bound, guarantees to build a valid topology and transfer data from source to end. ERCIM is robust with respect to addition or removal of single network nodes and transfer packet from starting node to ending node. This model consumes less energy with no collision. The proposed algorithm is to connect components to their nearest neighbors. Each node in the given ad hoc network forms a component of its own. It is also be suited for MPLS networks [11]. The Proposed Nearest Component Connector (PNCC) algorithm shows the nodes in Component Connector (CC) with nearest neighbor. It is based on the broadcasting a beacon and jitter value. Neighbor Discovery Agent (NDA) updates the neighbor nodes in run time. If the node timeouts for the transmission data, it removes arc from the graph. This protocol update is suggested at inter and intra zone levels to achieve the less energy consumption in the network.

V.SIMULATIONS In this section, the research focuses on presenting the simulations results for energy consumption of existing and proposed NCC algorithm. The Figure 2 shows the wireless ad hoc network animation graph implemented in NS2. It contains the thirty five nodes to communicate each other within the wireless range. The packets are transferred from source node to destination node. The transmission performed using the component connector of the wireless nodes.

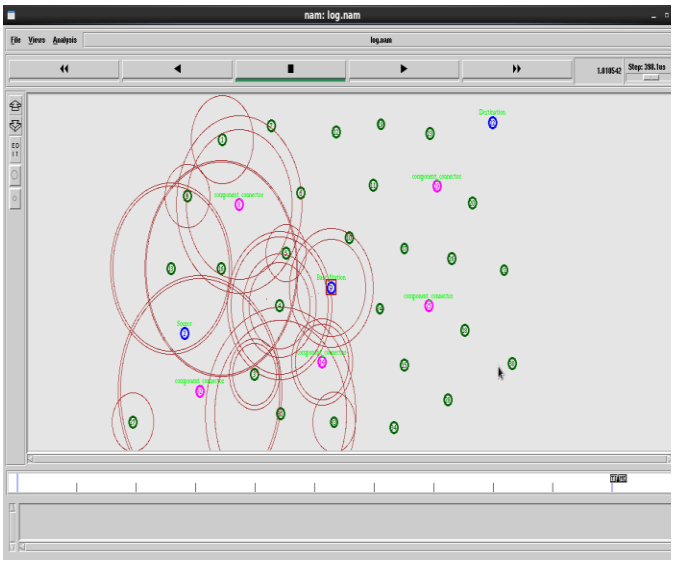

Fig. 2 Transmission of packets in wireless ad hoc nodes

The Enhanced Receiver Centric Interference Model of wireless ad hoc network and energy consumption of a set of nodes. The Proposed Nearest Component Connector(PNCC) algorithm generates a graph that has lower energy consumption compared with the existing NCC algorithm. Figure 2 shows the results of the wireless ad hoc network comparison graph implemented in NS2.

Table 2- Comparison between Existing and Proposed NCC

Simulation time (Seconds)	Energy consumption existing NCC(J)	Energy consumption PNCC(J)
10	33.3482	25.3482
20	66.6298	53.6298
30	102.2939	96.2939
40	103.007	101.007
50	103.007	102.007
60	103.007	101.665

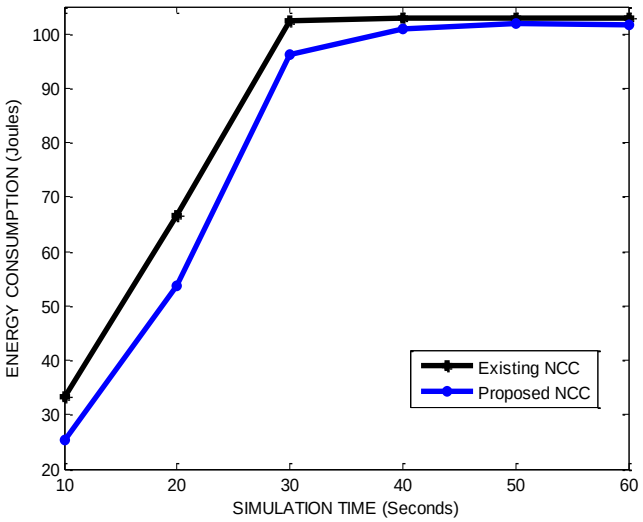

Fig. 3 Comparison of Energy consumption between Existing and Proposed algorithm

The Table 2 shows the energy consumption values from the existing and proposed algorithm. The PNCC algorithm save the energy, while transferring the data from source to destination node. This algorithm efficiently manages energy consumption by consuming about 1 to 8 joules. In this algorithm achieves more energy consumption in communication of the nodes in wireless ad hoc network.

VI.Conclusion

Energy utilization in wireless ad hoc network is a relatively important consideration of research. In this paper, I have presented analyses and specifications for achieving that goal. The concise discussion in this paper shows that, despite the large efforts of the wireless ad hoc network research community and the rapid progress made during the last years, lot of challenging technical issues are analyzed. The energy-aware routing protocol works only in the routing layer and utilizes only routing-specific information. It is clear that analyses the utilization of energy in wireless ad hoc network. Further work on this process I need to refine the solution of energy consumption in order to investigate the possibility of using PNCC algorithm in wireless ad hoc network.

REFERENCES

[1] Ram Ramanathan and Jason Redi. (2002), "A Brief Overview of ad hoc networks. IEEE Communications Magazine", pp. 41-43..
[2] Jan Suwart, (2008), "Wireless ad hoc networks: Limitations, Applications and Challenges", Tehnische University Report, pp.2-45.
[3] Imrich Chalmtac, Marco Conti and Liu J.N. (2003), "Mobile ad hoc networking: imperatives and challenges. Ad hoc networks", Vol.1, pp. 13-64.
[4] Mohammed Ali hussain, Ravi Sankar, Vijaya Kumar, Sirnivasa Rao, Nalla Lovanjaneyulu, (2011),"Energy Conservation Techniques in ad hoc networks". International Journal of Computer Science and

Information Technologies, Vol.2, No.3, pp.1182-1186.

[5] Feeney L.M. and Nilsson M, (2001), "Investigating the energy consumption of a wireless network interface in an ad hoc networking environment". In IEEE INFOCOM.

[6] Nishant Gupta and Samir R. Das, (2002), "Energy-Aware On-Demand Routing for Mobile Ad hoc Networks", Lecturer Notes in Computer Science, Springer, Vol. 2571, pp. 164-173.

[7] Min R and Chandrakasan A, (2002), "Top Five Myths about the Energy Consumption of Wireless Communication", ACM MOBICOM..

[8] Monks J, Ebert J.P, Hwu W.M. and Wolisz A,(2003), "Energy saving and capacity improvement potential of power control in multi hip wireless networks. Computer Networks", Vol. 3, No. 41, pp.313-330. Jae-Hwan Chang and Leandros Tassiulas. (2000), "Energy conserving routing in wireless ad-hoc routing", In Proceedings of the IEEE INFOCOM 2000 Conference, Tel Aviv, Israel.

[9] Manju bargavi S.K and Rajamani G.P, (2014). Energy Consumption in Wireless Ad hoc Network using ERCIM". International Review on Computers and Software, Vol.9,No.6, pp. 1088-1093.

[10] Lu Ruan and Zhi Liu,(2005), 'Upstream node initiated fast restoration in MPLS networks', IEEE conference on Communications, Seoul, Korea, vol. 2, pp. 959-964.

AUTHOR BIOGRAPHY

Dr. Manju bargavi S.K. obtained PG and doctoral degrees from Anna University, Tamil nadu, India. Her area of specialization is wireless ad hoc network and image processing. She has published a number of research papers in international journals and books related in computer engineering.