Volume 4, Issue 6, June 2014 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

MIN-MAX energy aware technique for communication life time increasing in Wireless Mobile Ad-hoc Network

Ashish Singh Baghel
CSE Dept, VNSIT Bhopal,
M.P., INDIA

Vivek Suryawanshi
CSE Dept, VNSIT Bhopal,
M.P., INDIA

Abstract—Mobile Ad hoc Network (MANET) consists of a bunch of mobile nodes which will communicate with one another without the requirement of any fixed infrastructure or central controller. The movement of nodes in MANET is random, so MANET has a dynamic topology. Owing to dynamic topology, the link breakages with unreliable information delivery in network are quite a common drawback in MANET. This drawback degrades the performance of the network like knowledge delivery, output and will increase the drop rate and delay .So for the resolution of this drawback, we tend to project MIN-MAX energy aware technique for increasing communication life time in Mobile Ad-hoc Network and provide more reliable communication .This approach will increase the route life time and packet delivery rate, throughput and reduces data drop, routing load and end-to-end delay. This approach has been enforced on the well-known Ad hoc On-Demand Distance Vector (AODV). This new mechanism will make us able to decrease the packet loss and delay that occur within the original protocol.

Keyword :- Energy, Mobility, MANET, Routing, AODV

I. INTRODUCTION

Mobile Ad hoc Network (MANET) consists of a group of mobile nodes. These nodes can communicate with each other wirelessly without the need to any existed infrastructure. In general MANET is known with its dynamic topology, which means no fixed infrastructure. The nodes are mobile and their movement is random. MANET dynamic topology produces link breakages as a frequent convention. This convention causes many problems such as data loss, delay, and others which degrade the performance of the MANETs protocols. In order to reduce the damage size of this phenomenon, the idea of link breakage prediction has appeared.

.

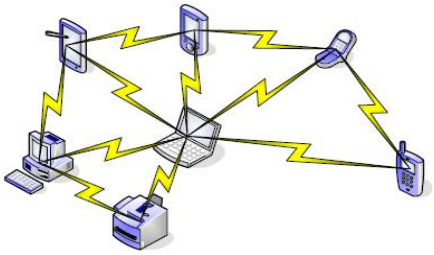

Fig1: Mobile Ad Hoc Network Topology

In link breakage prediction, a link breakage is foreseen before its real occurring thus route maintenance will begin before the occurring of the problem avoiding the issues that keep company with a link breakage. Within the link breakage prediction, a node in an energetic route will predict if the link between it and its previous hop can break shortly. During this case it will inform the supply node regarding the matter and therefore the supply node, if still desires the route, are going to be able to construct a brand new route that avoids this shortly to be broken link.It has been found that this procedure has created an honest improvement within the performance of the mobile ad hoc network's protocols, however the matter is that the focusing throughout constructing a brand new route was solely on excluding the link that was foreseen to own a link breakage. This mechanism could cause constructing a brand new route with some or all unhealthy links from the present used route that are weak however didn't predicted to be broken nevertheless. These links could break throughout or directly once the constructing of the new route which is able to cause a high decrease within the packet delivery quantitative relation and a high increase within the packet loss and delay. So as to boost the concept of link breakage prediction, this paper has proposed a brand new approach for link breakage prediction in MANETs. during this new approach, the supply node of an energetic route, once being knowing a couple of link breakage in its current used route, can construct a brand new route that avoids the utilization of any link from the present used route. Meaning excluding all the links within the current route, or in alternative words, excluding the full current used route not simply the shortly to be broken link. So, the new made route is going to be utterly completely different from the present used one. This approach is novel and it\'s been enforced on the well-known reactive routing protocol Dynamic supply routing Protocol (DSR).

Issues in MANETs: Energy, measurability and quality of services

Due to the very fact that information measure is scarce in MANET nodes which the population in an exceedingly MANET is increasing the measurability issue for wireless multi-hop routing protocols is generally involved with excessive routing message overhead caused by the increase of network population and quality. Routing table size is additionally a priority in MANETs as a result of massive routing tables imply massive control packet size thus large link overhead. Routing protocols usually use either distance-vector or link-state routing algorithms and solely within the last years conjointly geographical routing protocols that build use of node location or position are investigated. However, measurability problems in terms of overhead and, consequently variety of nodes operative within the network ar powerfully connected conjointly to energy consumption as a result of higher numbers of enhance packets overhead imply additional energy consumption spent in transmission, reception and overhearing. This suggests that trying to design additional ascendable protocols offers additional advantages conjointly to the energy saving of mobile nodes in an exceedingly MANET.

When we think about the planning of energy efficient routing protocols not continually this suggests that the routing ways are ascendable as a result of the protocols will cut back the energy consumption under just a few specific operative conditions like lower quality, light-weight traffic load or low variety of nodes. This suggests that the planning of associate energy-efficient routing protocol should think about conjointly measurability issue so as to use it in wider eventualities and to make certain that the protocol performance doesn't degrade an excessive amount of once some project parameters are dynamical.

Moreover, the chance to offer higher information measure to a association and consequently higher rate imply usually to run through the battery charge of a node additional quickly. During this read, conjointly QoS aware routing protocols ought to take under consideration conjointly the energy problems associated with the principle of the forwarding scheme, route maintenance and path discovery.

II. ROUTING PROTOCOLS FOR BALANCED ENERGY CONSUMPTION

Surveys energy efficient routing protocols developed for MANETs. It is noted that direct comparison of these protocols is extremely difficult because these approaches have different goals with different assumptions and implementation levels. Nevertheless, there are three major issues involved in energy aware routing protocols. First, the goal is to find the path that either minimizes the absolute power consumed or balances the energy consumption of all mobile nodes. Balanced energy consumption does not necessarily lead to minimized energy consumption, but it keeps a certain node from being overloaded and thus, ensures longer network lifetime. Since the energy balance can be achieved indirectly by distributing network traffic, one such routing protocol is also discussed in this section. Second, energy awareness has been either implemented at purely routing layer or routing layer with the help from other layers such as MAC or application layer. For example, information from the MAC layer is beneficial because it usually supports power saving features which the routing protocol can exploit to provide better energy efficiency. Third, some routing protocols assume that the transmission power is controllable and nodes' location information is available (e.g., via GPS). Under these assumptions, the problem of finding a path with the least consumed power becomes a conventional optimization problem on a graph where the weighted link cost corresponds to the transmission power required for transmitting a packet between the two nodes of the link.

III. ENERGY AWARE ROUTING MODULE

The nodes in an ad hoc network are constrained by battery power or energy for their operation. To route a packet from a source to a destination involves a sufficient number of intermediate nodes. Hence, battery power of nodes in network is a precious limited resource that must be used efficiently in order to avoid early termination of a node or a network. Thus, energy utilization and management is an important issue in dynamic networks. Energy Efficient utilization, transmission energy management and system power management are the major means of increasing the life of a node.

These management schemes deals in the management of energy resources. By controlling the early depletion of the battery, adjust the transmission power according to next neighbor to decide the proper power level of a node and incorporate the low power strategies into the protocols used in various layers of protocol stack. There are so many issues and solutions which witnesses the need of energy management in ad hoc wireless networks.

A few reasons for efficient energy utilization in MANETs are Limited Energy of the nodes, Difficulties in Replacing the Batteries, Lack of Central Coordination, Constraints on the Battery Source, Selection of optimum Transmission Power, and Channel utilization. Finally at the network layer, issues which are open are as designing of an efficient routing algorithm that increases the network lifetime by selecting an optimal relay node. For that purpose we set each node initial energy as a randomly and set threshold energy as 10 joule we also define discharge energy on the bases of transmission power, receiving power and idle power with respect to time and calculate existing path using AODV routing protocol.

IV. LITERATURE SURVEY

In this paper [1] proposed energy aware technique provides the information of remaining energy level of each node, died node and life time of the node in the network. Conditional Min-Max Battery Cost Routing Algorithm (CMM-BCR) Fulfills our objective of providing efficient energy utilization by choosing path which has higher battery capacity rather than higher battery cost and that is the reason we have chosen CMM-BCR as our proposed algorithm [2, 3, 4] details of

which is provided below. In CMM-BCR a threshold value is defined and performance of CMM-BCR id based on threshold value.

This paper proposed [5] a simple but energy efficient design for AODV Routing Protocol which makes some nodes silent without forwarding the redundant rebroadcasting of the RREQ packets which is not used by any other node in the network for finding routes. The performance of energy consumption design to AODV is called as Energy Efficient AODV (E2AODV) in MANET. E2AODV provides efficient energy consuming routing protocol with reduced routing overhead.

Ramesh et al. [6] have studied the problem of link breakage prediction in the DSR routing protocol. Their idea is that during the route discovery process, the source node builds two routes which are the source route and another route can be used as a backup. The important use of breakup route is if the primary route (source route) was predicted to have a link breakage soon.

Li et al. [7] have studied the link prediction in the AODV routing protocol by establishing a signal intensity threshold which is Pr-THRESHOLD. If the received signal intensity is lower than the threshold, the upstream node will calculate the distance between it and the sending node through the intensity of the received packet signal, and estimate the relative velocity between it and the sending node through the time difference of the neighboring received data and the intensity of the packet signal. Then, according to the relative position and the relative velocity with the sending node, a node can estimate when to send a RRER to the sending node to warning it about a link failure. When the source node received this RRER message, it will start its restored process searching its routing table and find another route to the destination.

Qin & Kunz [8] have dealt with the problem of link failure prediction by proposing an equation to calculate the exact time that a link breakage can occur. They named their method the link breakage prediction algorithm. In their idea, each node maintains a table that contains the previous hop node address, the value of the received packet signal power, and the time which this data packet has been received. After receiving three data packets, an intermediate connector node will calculate the link breakage time and compare it with a fixed threshold. If any intermediate node predicted that the link with its previous neighbor will have a problem of link breakage shortly then it will sending a warning message to the source node of the active route to warn it about the link breakage probability. If the source still needs the route it will perform a route discovery process to establish a new route to the destination. Their idea has been implemented using DSR routing protocol.

Choi et al. [9] has dealt with the problem of link breakage prediction in vehicular ad hoc network. They proposed an algorithm to predict a link breakage possibility using the value of the RSSI (Received Signal Strength Indicator). Each vehicle in the network periodically scans the received signals from its neighbors and uses the collected value to calculate the distance, the velocity, and the acceleration of its next hop which it receives data packets from. By calculating these three values, the node can predict if a link breakage will occur, and can determine if the effected link can be maintained or a new link is needed to be constructed. If the effected vehicle found that a link breakage in the link with its next hop will occur, it will use one of its neighbors which has the highest value of RSSI with (that means the one which is the nearest to it) to build a new link with before the previous link with its other neighbor becomes broken.

Goff et al. [10] have studied the link breakage problem in the DSR routing protocol. They defined a region they named it the preemptive region, and they also defined a threshold which they named it the preemptive threshold, they defined this threshold as the signal power of the received packets at the edge of the preemptive region. When a node enters the preemptive region it will send a warning message to the source node of the active route in order to inform it that a link breakage will soon occur. So if the source is still interesting with the route, it will generate a route discovery process to establish a new route without that soon to be broken link.

Li Layuan [11] this paper proposed an energy level based routing protocols (ELBRP). The routing protocol in network is not only makes the system energy consumption down but also prolongs the system lifetime and improves the delay characteristic. In this paper, the proof of correctness and complexity analysis of ELBRP are given. In this paper the comparison of three existing protocols AODV, RDRP and proposed ELBRP via simulation are analysed. The performance are shows that ELBRP has a better delay performance due to energy end link breakage, and a lower energy consumption and longer network lifetime than the other two and provides an available approach to ad hoc networks routing.

S. Sioutas [12] this paper purposed and based on the efficient P2P method presented in the design a novel P2P overlay for Energy Level discovery in a sensor net, the so-called ELDT (Energy Level Distributed Tree). Sensor nodes are mapped to peers based on their energy level. The energy of sensor nodes are depleted and the sensor nodes would have to move from one peer to another and this operation is the most crucial for the efficient scalability of the proposed system.

V. PROBLEM STATEMENT

Mobile Ad-hoc Network partitioning interrupts communication session ,this can be caused by node movement or by node failure due to energy depletion. Whereas the former cannot be controlled by the routing protocol, the latter can be avoided through appropriate routing decisions. Operational lifetime is therefore defined in this survey as the time until network partitioning occurs due to battery outage.

A few reasons for energy deterioration in MANETs are Limited Energy of the nodes, Difficulties in Replacing the Batteries, Lack of Central Coordination, Constraints on the Battery Source, Selection of optimum Transmission Power, and Channel utilization. All of them is big challenge to manage energy issue in MANET environment, so our aim to efficient as well as reliable communication using energy aware of each node and apply MIN MAX scheme.

VI. PROPOSED METHODOLOGY

In our proposed scheme we use the energy module and set the initial energy to all node and also set transmission power, receiving power, idle power and sleep power required by the each node , according to various paper we set decreasing power of energy level and simulate the result of mobile nodes. For achieving the goal of proposed work very first we broadcast route request packet through number of intermediate node's and check node energy of each devices on the bases of MIN MAX energy scheme, in this scheme if two intermediate node exists in two different path so same time duration we check both device current energy and calculate MIN MAX, and select route as maximum contain energy node, we apply this process until we reach the destination , After find route on the basis of energy level we send actual data packet to the destination this work increases the life time of communication between senders to destination.

VII. EXPECTED OUTCOME OF OUR PROPOSED WORK

Our proposed work simulate through network simulator-2, and provide result in the form of network parameter like throughput, packet delivery ratio, energy consumption of each node, and end-to-end delay, routing load etc. through our work will gives better result in the form of network parameter and efficiently with intellectual result gives. Following parameter we define here:-

- ***Packet Delivery Ratio:*** The ratio between the number of packets originated by the application layer CBR sources and the number of packets received by the CBR sink at the final destination.
- ***Average End-to-end Delay:*** This includes all the possible delays caused by buffering during route discovery latency, queuing at the interface queue, retransmission delays at the MAC, and propagation and transfer times.
- ***Packet Drop:*** The routers might fail to deliver or drop some packets or data if they arrive when their buffer are already full. Some, none, or all the packets or data might be dropped, depending on the state of the network, and it is impossible to determine what will happen in advance.
- ***Routing Load:*** The total number of routing packets transmitted during the simulation. For packets sent over multiple hops, each transmission of the packet or each hop counts.
- ***Energy Utilization:*** that parameter base we analyze is fraction of second discharge energy of each mobile node that provide energy utilization graph of nodes.

VIII. CONCLUSION

Our proposed methodology under MIN MAX base energy scheme that provide reliable communication and provide energy of each node that work provide maximum data delivery in each session and increases the performance of the network like packet delivery ratio, throughput and minimize the end-to-end delay, will It will also gives each node's energy value, required transmission power and receiving power. Energy based routing protocol always gives accuracy of the result and also increases life time of the network.

REFERENCES

[1] Sheetal Sisodia and Sandeep Raghwanshi,"Performance Evaluation of a Table Driven and On- Demand Routing Protocol in Energy Constraint MANETs", IEEE 2013 International Conference on Computer Communication and Informatics (ICCCI -2013), pp. 1-8, Jan. 04 – 06, 2013, Coimbatore, INDIA.

[2] S.S. Tyagi, R.K. Chauhan," Performance Analysis of Proactive and Reactive Routing Protocols for Ad hoc Networks ", International Journal of Computer Applications (0975 – 8887) Volume 1 – No. 14, 2010.

[3] C.-K. Toh, "Maximum Battery Life Routing to Support Ubiquitous Mobile Computing in Wireless Ad Hoc Networks ",IEEE Communication Magazine,june 2001.

[4] Tracy Camp, Jeff Boleng, Brad Williams, Lucas Wilcox, William Navidi, "Performance Comparison of Two Location Based Routing Protocols for Ad Hoc Networks ",in proceeding of IEEE INFOCOM 2002.

[5] S.Preethi and B. Ramachandran, "Energy Efficient Routing Protocols for Mobile Ad Hoc Networks", IEEE International Conference on Emerging Trends in Networks and Computer Communication (ETNCC), pp. 136-141, 22-24 April 2011.

[6] Ramesh, V., Subbaiah, P., and Supriya, K. Modified DSR (preemptive) to reduce link breakage and routing overhead for MANET using proactive route maintenance (PRM). Global Journal of Computer Science and Technology. Vol. 9. Issue 5, 124-129, 2010.

[7] Li, Q., Liu, c., and Jiang, H. (2008). The routing protocol AODV based on link failure prediction. ICSP IEEE. 2008.

[8] Qin, L., and Kunz, T. (2002). Increasing packet delivery ratio in DSR by link prediction. HICSS 03. IEEE. 2002. Hawaii.

[9] Hoi, W., Nam, J., and Choi, S. (2008). Hop state prediction method using distance differential of RSSI on VANET. NCM 2008. IEEE. 426-431.

[10] Goff, T., Abu-Ghazaleh, N., Phatak, D., and Kahvecioglu, R. (2003). Preemptive routing in ad hoc networks. Journal of Parallel and Distributed Computing. 63 (2003), 123-140.

[11] Li Layuan An Energy Level Based Routing Protocol in Ad Hoc Networks (2006) Conference on Intelligent Agent Technology (IAT'06) Proceedings of the IEEE/WIC/ACM International IEEE.

[12] S. Sioutas Building an Efficient P2P Overlay for Energy-Level Queries in Sensor Networks *MEDES 2009* October 27-30, 2009, Lyon, France.

