INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & MANAGEMENT

SURVEY CONVICTION BASED SOLUTION FOR UNCERTAIN NODE ENERGY IN MANET

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ABSTRACT

Ad hoc wireless networks are energy constrained since nodes operate with limited battery energy. If some nodes die early due to lack of energy, they cannot communicate with each other. Therefore, inordinate consumption of nodes energy should be prevented. In fact, node energy consumption should be balanced in order to increase the energy awareness of networks. In this paper we proposed a new energy based thrust routing update scheme in MANET. In this scheme we set a threshold value in energy of mobile nodes in our network because of detecting the unfaithful nodes. If energy less than the defined threshold value then communication between the nodes are stop. According to our approach we aware our network about energy of nodes by that we remove the problem of suddenly lost of session and extend the life cycle of network.

Key words: MANET, unfaithful nodes, Updates, Threshold

INTRODUCTION

An ad hoc network consists of hosts communicating among themselves with portable radios. This network can be deployed without any wired base station or infrastructure support where Routes are mainly multi-hop because of the limited radio propagation range. An Ad hoc network is adaptive in nature and is self organizing. A "mobile ad hoc network" is an autonomous system of mobile hosts which are free to move around randomly and organize themselves arbitrarily. In this wireless topology may change rapidly and unpredictably. A mobile ad hoc network is also called MANET. The main characteristic of MANET strictly depends upon both wireless link nature and node mobility features. Basically this includes dynamic topology, bandwidth, energy constraints, security limitations and lack of infrastructure. MANET is viewed as suitable systems which can support some specific applications as virtual classrooms, military communications, emergency search and rescue operations, data acquisition in hostile environments, communications set up in exhibitions, conferences and meetings, in battle field among soldiers to coordinate defence or attack, at airport terminals for workers to share files etc. Topology of the network changes frequently and unpredictably since its host moves randomly.

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Therefore, routing is an integral part of ad hoc communication, and has received interests from many researchers. In traditional "on-demand" routing schemes like Ad Hoc On Demand Distance Vector Routing (AODV) scheme [1][2], when route disconnects, nodes of the broken route simply drop data packets because no alternate path to the destination is available until a new route is established. When the network traffic requires real time delivery (voice, for instance), dropping data packets at the intermediate nodes can be costly. The Power aware update scheme in Ad hoc routing protocol enables dynamic, self starting, multi hop routing between participating mobile nodes wishing to establish and maintain an ad hoc network. It allows mobile nodes to maintain routes to destinations with more stable route selection.

We present a simple and energy aware Ad hoc on-demand routing scheme by using discrete level of power control with little additional routing updates overhead, the proposed scheme provides better way to deliver data than existing routing protocols which use fixed transmission energy. The hosts of ad hoc network can be any type of mobile computing devices or communication tools[3] which have limited battery capacity, energy-constrained operation usually only allows short range of radio propagation. As a way to reduce routing overhead,

we are interested in the effect of energy awareness which tunes the strength of radio transmission. Here we consider the effects of node distribution pattern in the wireless ad hoc network, and propose a new energy aware route update search scheme which provides the shortest efficient route within given route search delay bound.

Routing in ad hoc network

Routing in an ad hoc network is trivial, if all the nodes are within transmission range of each other. All the nodes can be reached with a single hop. The transmission medium works much the same way as in a wired broadcast network. Complexity increases dramatically when distances increase and multi-hop routing is required. Routing in ad hoc networks is usually divided into proactive and reactive routing. The latter is also known as on demand routing.

TABLE DRIVEN & PROACTIVE PROTOCOL

In Table Driven routing protocols each node maintains one or more tables containing routing information to every other node in the network nodes keep on updating these tables to maintain latest view of the network. Some of the famous table driven or proactive protocols are: DBF [4], GSR [5], WRP [6],

ON DEMAND & REACTIVE PROTOCOL

In On Demand routing or reactive protocols, routes are created as and when required. When a transmission occurs from source to destination, it invokes the route discovery procedure. The route remains valid till destination is achieved or until the route is no longer needed. Some famous on demand routing protocols are: DSR [7], DDR [8], TORA [9], AODV [10], RDMAR [11]. Study has been concentrated for reactive protocols because they work well in dynamic topology. The comparison between table driven and on demand routing are described in table 1

TABLE 1

TABLE DRIVEN	ON DEMAND
Attempt to maintain consistent, up-to-date routing information from each node to every other node in the network.	A route is built only when required.
Constant propagation of routing information periodically even when topology change does not occur.	No periodic updates. Control information is not propagated unless there is a change in the topology.
Incurs substantial traffic and energy consumption, which is generally scarce in mobile computers	Does not incur substantial traffic and energy consumption compared to Table Driven routing protocols.
First packet latency is less when compared with on-demand protocols.	First-packet latency is more when compared with table-driven protocols because a route need to be built
A route to every other node in ad-hoc network is always available	A route to every other node is not always available.

survey of routing protocols for ad hoc networks have been discussed in [12, 13].

RELATED WORK

Main emphasis of research on routing protocols in Ad Hoc networks has been delivery of packets and network performance. There have been less amount of work on energy aware deterioration routing schemes though it is very important aspect in route selection and performance of protocol. Some study has been done in this context and presented is a brief review of them.

Shivashankar, H.N Suresh, Varaprasad Golla, G Jayanthi [14] has evaluated three power-aware ad hoc routing protocols in different network environment taking into consideration network lifetime and packet delivery ratio. Overall, the findings show that the energy consumption and throughput in small size networks did not reveal any significant differences. However, for medium and large ad-hoc networks the DSR performance proved to be inefficient in this study. In particular, the performance of EPAR, MTPR and DSR in small size networks was comparable. But in medium and large size networks, the EPAR and MTPR produced good results and the performance of EPAR in terms of throughput is good in all the scenarios that have been investigated.

Peyman Arebi [15], proposes a novel method based on energy estimation to restore broken links and reconstruct the paths of them. So investigate Effect of broken links on topology control and routing process in Wireless Ad hoc Network. It was indicated that these effects were harmful in the mentioned couple of network portions. In this paper has been used Hardware Method for estimation energy in adhoc node, so this method has a high speed

Golla Varaprasad [16], it considers two metrics namely, residual battery capacity and relay-capacity of the node to do multicasting from the source to a group of destination nodes. Here, the network lifetime is a key design factor. In order to increase the network lifetime, it is obliged to attain the tradeoff of minimizing the energy consumption and load. The proposed model uses neighboring-node table, routing table and group table to forward data packets from

one node to another. Neighboring node table of each node keeps information of others that are within the transmission range. This table contains node id, node position, lifetime of battery and relay capacity information. The proposed model is compared with the existing algorithms such as multicast-incremental-power, lifetime-aware-multicast tree, multicast-ad-hoc-on-demand-distance-vector protocol and multiple-path-multicast-ad-hoc on-demand vector. The proposed model shows the best results in terms of node lifetime, network lifetime and throughput.

Martin M. Mhlanga, Thomas O. Olwal, Murimo B Mutanga, Mathew O. Adigun [17] proposed standard specifically designed for WMN, the IEEE 802.11s does not consider energy conservation as a priority in its protocol. The main goal of this research therefore is to minimize the total transmission energy consumed for a packet to reach the intended destination. However, the usual approach of selecting the shortest path when routing packets may drain out the energy of the nodes along the chosen paths. Using this kind of an approach may halt the delivery information in the long run causing network partitioning even though there are network nodes with enough energy for transmission. Therefore we introduced an energy optimization based path selection algorithm for IEEE 802.11s WMNs that will maximize the network lifetime. The proposed energy optimization based path selection algorithm provides a balanced energy spending among nodes which therefore maximizes the network lifetime. The balanced energy spending will reduce the amount of workload which is usually given to other nodes which are unfairly burdened to support many packet-relaying functions.

ENERGY AWARE DETERIORATION ROUTING BASED ON AODV (EADR-AODV)

The second on-demand routing protocol we propose is called EADR-AODV (Energy-Aware deterioration Routing based on AODV). The main objective is to extend the useful service life of an ad hoc network.EADR-AODV solves the problem of finding a route at route discovery time t, such that the following cost function [6] is minimized:

The route discovery for EADR-AODV are described below

$C(\pi,t) = \sum_{i \in \pi} Ci(t)$

Where $C_i(t) = \rho_i \left(\frac{Fi}{Ri(t)}\right)^{\gamma}$

ρ_i = Transmit power of node i
Fi = Full charge capacity of node i
Ri= Remaining battery capacity of node i at time t
γ = Transmit connection request to all reachable neighbour nodes.

PROPOSED METHODOLOGY

In this paper we propose a new approach to improve network performance. In this approach we are try to make a energy aware network to find out unfaithful nodes in the network and increases the energy utilization and try to solve the problem of suddenly lost of session. Due to suddenly lost of session most of the energy is wasted in the foam of loss of packets, retransmission and delay.

PROPOSED CONNECTION ESTABLISHMENT ALGORITHM & ROUTING UPDATE WITH THRESHOLD VALUE

Initial energy = E (Suppose E = 100)
Threshold energy = Q_1 (10% of E) //for alert the energy level.

1) If {(**E** > **Q_1**) && (radio range from source to next hop (up to destination) < 250m)
Then
{ Establish connection from source to destination }
Else
{No connection establishment}

2) If {(**E** == **Q_1**)}
{Nodes will stop their working & goes to sleep mode}

2) If {(node energy charge up == 100) && (radio range from source to next hop ≤ 250m)}
{Go to **step 1}**
End

SIMULATION ENVIRONMENT

The simulation described in this paper was tested using the ns-2 test-bed that allows users to create arbitrary network topologies [18]. By changing the logical topology of the network, ns-2 users can conduct tests in an ad hoc network without having to physically move the nodes. ns-2 controls the test scenarios through a wired interface, while the ad hoc nodes communicate through a wireless interface.

TABLE 2
SIMULATION PARAMETER FOR CASE STUDY

Number of nodes	8,20,30,50
Dimension of simulated area	800×600
Initial node energy (joules)	100
Threshold value(joule)	10
Simulation time (min)	100
Radio range	250m
Traffic type	CBR, 3pkts/s
Packet size (bytes)	512
Number of traffic connections	TCP/UDP
Maximum Speed (m/s)	35
Node movement	random

Tx energy consumption	1.5J
Rx energy consumption	1.0J
Idle energy consumption	0.017J
Sleeping energy consumption	0.001J

PERFORMANCE METRICS

Throughput: Number of packets sends in per unit of time.

Packet delivery fraction (PDF) : The ratio between the numbers of packets sends by source nodes to the number of packets correctly received by the corresponding destination nodes.

End to End delay: Measure as the average end to end latency of data packets.

Normalized routing load: Measured as the number of routing packets transmitted for each data packet delivered at the destination.

CONCLUSION

All parameters are shown that in threshold level results are better as compare to without threshold level. In threshold level or update case definitely the life of node increases then it utilizes their energy efficiently. A scheme has been proposed that utilizes energy status of each mobile node and alternate paths. This scheme can be incorporated into any ad hoc on-demand routing protocol to improve reliable packet delivery in the face of node movements and route breaks. Alternate routes are utilized only when data packets cannot be delivered through the primary route. As a case study, it has been applied to AODV and performance has been studied via simulations. Simulation results have indicated that new technique provides robustness to mobility and enhances protocol performance. However, this scheme may not perform well under sparse traffic networks. Its performance has been found much better than other existing protocols in dense medium as probability of finding active routes increases.

The proposed scheme has three phases:

I. Route Discovery

2. Route Selection

3. Route Maintenance

These three steps are taken on the basis of normal energy routing with AODV protocol and proposed energy based scheme with AODV routing protocol.

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