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OPTIMIZATION OF DYNAMIC CHANNEL ALLOCATION TECHNIQUES IN MOBILE WIRELESS SENSOR NETWORK

Vivita Sherin B. and Sugadev M.
Department of Electronics and Communication Engineering, Sathyabama University, Chennai, Tamilnadu, India
E-mail: sherinmolz27@gmail.com

ABSTRACT

Wireless network needs an access mechanism and communication services during the mobility of the nodes. A Mobile Ad hoc network is a type of Wireless network services which is provided when infrastructure is not available or in an impractical or expensive environment like Emergency rescue operation , military application, home networking. In ad hoc network host (mobile node) movement is frequent, topology changes are frequent, where there is no fixed cellular infrastructure for a multi hop network and data must be routed via intermediate nodes. Ad hoc network is used for setting up of fixed access point as the backbone infrastructure is not viable i.e. impractical or destroyed and with increased users daily in turn increases the significance of bandwidth efficiency by maintaining the tight requirement on energy consumption and delay. An Ad hoc On-Demand Distance Vector (AODV) Routing is a routing protocol used in these mobile ad hoc networks (MANETs) which provides on demand services by providing the dynamic channel allocation. A novel algorithm for the optimization of the dynamic channel allocation is provided for a CBR (cluster based routing) called "Mobile cluster based relay reconfiguration (MCRR)" Where the cluster head is chosen considering the energy of the all nodes in the cluster .This approach is used for increasing the performance by optimization in terms of throughput, energy consumption, packet loss and bandwidth for mobility mobile nodes. This paper the existing approaches are compared to the optimized algorithm MCRR through the simulation using the RED HAT software.

Keywords: MANET, AODV, CBR, MCRR, mobile.

INTRODUCTION

Mobile Adhoc Network (MANET) is an self-sustaining system of mobile station called nodes connected by wireless links. A MANET does not need any support from any existing network communication like an Internet gateway or other fixed stations. The wireless topology may dynamically change in a spontaneous manner since nodes are free to move data is transmitted in a stored and forwarded manner using a multi hop routing. Each node is provided with a wireless transmitter and a receiver with an appropriate antenna. We presume that it is not possible to have all mobile nodes together within one another radio range. When the nodes are close-by i.e., within radio range, no routing issues will be addressed. The use of wireless communication system by various users has become increasingly popular due to present performance in computer and wireless technology. This leads to lowering of prices and higher data rates, which are the two main reasons why mobile computing is assumed to be increasingly widespread use and applications. The first approach is to make use of a fixed network infrastructure to provide wireless access points. Here, a mobile host communicates to the network through a radio access point of its communication range. While it goes out of range of one access point, it connects with the new access point within its range and starts communicating through it. The second approach is to form an ad-hoc network among users wanting to communicate with one another. This means that all mobile nodes of these networks behave as routers and take part in detection and maintenance of routes to other mobile nodes in the network. This type of networking is limited in range by the individual mobile node transmission range and it is typically smaller when compared to the range of cellular systems.

RELATED WORKS

Dynamic channel allocation in wireless ad hoc networks

'Shaan Mahbubani', proposed that lowest number of packets can be transmitted through the assigned channel it had improved the throughput on 802.11 ad-hoc network by the factor up to twice the throughput achieved and also improves the network Dynamic channel allocation provides an improvement only when the statically allocated channel suffers from a large amount of contention, and other channels are relatively underutilized.

Energy balanced routing method based on forward-aware factor for wireless sensor networks

Degan Zhang says that FAF-EBRM is compared with LEACH and EEVC, which balance the energy consumption and prolong the function lifetime and guarantees high QoS of WSN it also balance the energy consumption, increases the function lifetime.

Dynamic channel allocation with location awareness for multi-hop mobile ad-hoc networks

Yu-Chu Tseng, Chin-Min Chaw, suggest a new channel assignment and medium access protocol for MANET that is characterized by appealing on-demand, dynamic and location aware properties. Most active protocols do not contain these properties. Simulation result shows the significant improvement in both throughput and delay, which uses static channel assignment.

Traffic -Aware channel assignment in wireless sensor networks

Matthew Keally, Gang Zinou propose a traffic-aware frequency assignment design that actually considers different traffic requirements from neighbouring nodes through frequency decisions. The traffic-aware frequency assignment is compared with two common frequency allocation methods: even selection and eavesdropping. The simulation demonstrates the traffic-aware channel assignment had greatly improved the multi-channel MAC performance. It significantly enhanced the packet delivery ratio and throughput, while at the same time reduced the channel access delay and energy consumption.

Channel allocation and medium access control for wireless sensor networks

This paper proposed a distributed channel assignment algorithm using DCA which efficiently allocates channels to select randomly deployed sensor nodes. This algorithm can be used as a base algorithm for several different methods like channel allocation, to assign a non-overlapping TDMA slots and nodes addresses to sensor networks.

Zone-divided and energy-balanced clustering routing protocols for wireless sensor networks

In this article, a wireless sensors network routing protocol ZECR protocol which is efficient which is efficient in the energy heterogeneous environment. This protocol simplifies the network topology through the zone division and considers the energy factor in the cluster head competition phase and in the inter-cluster routing selection phase and also to solve the hot spots problem.

An innovation mobility based self-stabilizing clustering algorithm for MANET

S. Muhuramalingam, V. Vignaraj Ananth, M. Sahish Kumar describes that in mobility based algorithm, the reconfiguration frequency of the network is reduced by the selection of a cluster head with least mobility. This is done by calculating the response time of the nodes in the cluster and the node with highest response time will be selected as the cluster head. This can be considerably reduce overhead caused by the increase in reconfiguration frequency and increases the self stabilizing quality of MANETs.

An improved energy efficient clustering algorithm for non- availability of spectrum in cognitive radio users

V. Shunmuga Sundaram proposed that in ordered to avoid the overlapping of the cluster and to provide the equal sized clusters with constant energy for the mobile nodes .The mobile nodes rate should be very low, therefore the overall throughput could be increased and to avoid the communication of the unnecessary information using multichannel sequence algorithm.

Dynamic channel allocation

In wireless and cellular networks it allocates bandwidth and communicates the channel to the base station. Dynamic channel allocation is more efficient because channels are not allocated to cell indelibly, instead for every cell request to the base station request channel from the mobile station channel. Dynamic channel allocation also handles the cell traffic and utilizes the cellular radio resources more efficiently. It allows the no of channels in a cell to vary among the traffic load, hence increasing channel capacity with little cost.

METHODOLOGY OF WORK

MCRR (Mobile cluster based relay reconfiguration) is the algorithm based on the Ad hoc On-Demand Distance Vector (AODV) Routing used as a routing protocol in mobile ad hoc networks (MANETs). AODV enables "dynamic, self-starting, multi-hop routing between mobile nodes to begin and maintain an ad hoc network. AODV allows for the construction of routes to exact destinations and does not need to keep these routes, when they are not in active communication. The AOSV based MCRR (mobile cluster based relay reconfiguration) is re-configured for the moving nodes within the clusters using various factors like range, mobility, bandwidth and energy efficient. Therefore it is used to increase the network lifetime and algorithms detect the availability channel for the device and regularly check the interference and malicious node in the group of the nodes of the cluster. If any interference detected it should alternate the channel or if any malicious node is encountered it neglects the path formed along the particular node.

A. Flow chart for establishment of the wireless scenario

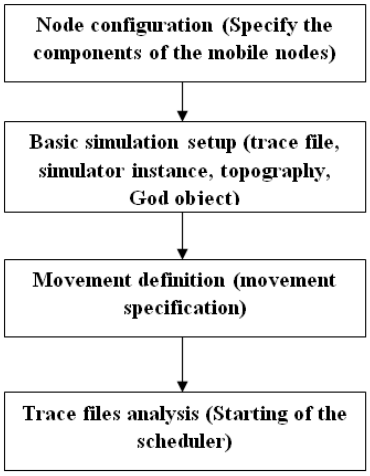

Figure-1. Moments of nodes.

B. Node configuration

A node which is a mobility mobile node move about 1600m × 1600m boundary area is selected. A link layer has to be established between the source and the destination. Packets are exchanged between the nodes as they come within range of one another. The packets get dropped as they move away. This algorithm reduces the packet loss as shown in the graph Figure-6. The node is configured by creating a tcl script for the wireless

simulation. A mobile node consists of network components like Link Layer (LL), Interface Queue (IFQ), MAC layer, the wireless channel nodes transmit and receive signals by relay in the packets between the sources to the destination. Additionally we describes other parameters like different type of antenna, the radio-propagation model, the type of ad-hoc routing protocol used by mobile nodes etc.

C. Basic simulation set up

First, we need to configure nodes before we can create them. Node configuration API may define the type of addressing (flat/hierarchical etc), the type of adhoc routing protocol, Link Layer, MAC layer, IFQ etc. The configuration API can be defined as follows:
$ns_ node-config

Addressing type	**Flat or hierarchical or expanded**
Adhoc Routing	LL
MAC Type	MAC/802-11
Prop Type	"propagation/Two ray ground"
IfqType	"queue/drop tail/pri queue

Algorithm

```
set sensor[new Agent/Sensor Agent]
$ns_attach-agent $node_(0) $sensor04
[$node_(5) set ||_(1)]up-target $sensor04
set src [new Agent/UDP]
set sink [new Agent/UDP]
$ns_attach-agent $node_(1)  $src
$ns_attach-agent $node_(1)  $sink
$src set packetSize_5000
$src set interval_ 0.003
Set app[new Application/SensorApp]
$app attach-agent $src
$ns_at 1.3 "app start $sensor04"
```

The nodes are initialized and the initial weight is set as zero. Then the neighbours are found and if the Euclidian distance is less than range then the edge exists. If not the edge does not exist and the weight is incremented .Then the mobility of each node is compared and the node with least mobility is selected as cluster head. if not then the nodes is labeled as ordinary node. Alive messages are sent to all the nodes and the response time is calculated for each node and the node with highest response time is selected as the next cluster head. Important factor in deciding the cluster heads In order to ovoid frequent cluster head changes it is desirable to elect a cluster head that does not move very quickly. when the cluster head moves fast ,the nodes may be detached from the cluster head and as a reconfiguration occurs

Movement definition flow chart

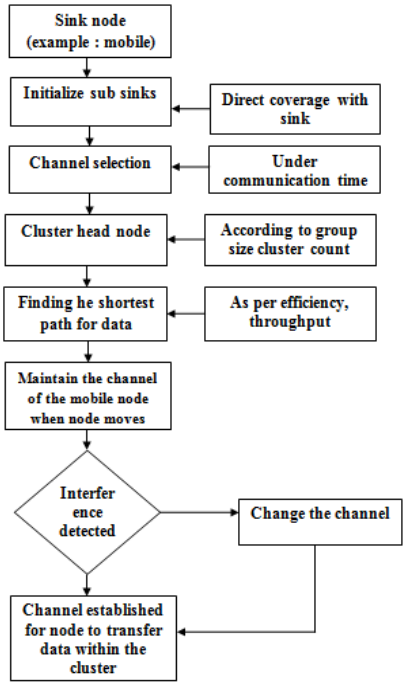

Figure-2. Moments of nodes.

Trace files analysis

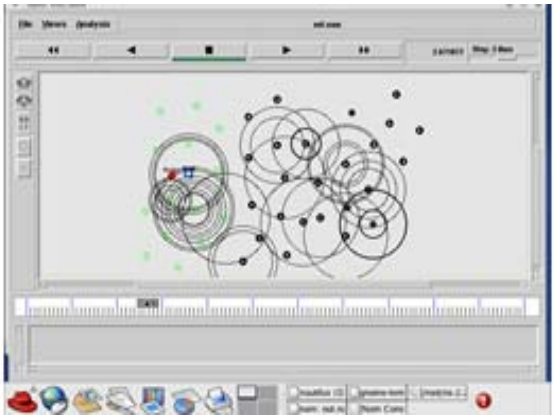

Figure-3. Endowment of connection of cluster head nodes using sink nodes.

The Location of the mobile nodes may change periodically. Hence the Neighbouring nodes should be discovered to detect the mobile nodes in a communication range. The information of the node should be updated regularly to find the channel availability. The multiple numbers of nodes should find the destination for the transfer of message.

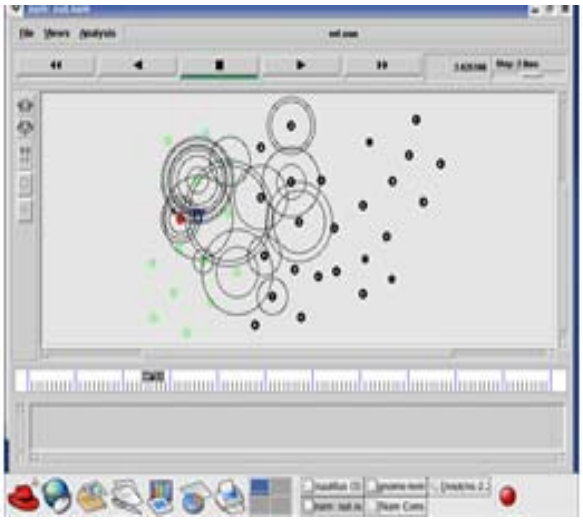

Figure-4. Process of sink nodes inside a coverage area.

The cluster head and the node must have the energy to make available communication for other nodes. The proposed protocol should select the coverage area by sink node .This sink node will move around the cluster. Based on the energy of the nodes the data will be transmitted It results in the lower delay and provides higher bandwidth in the network.

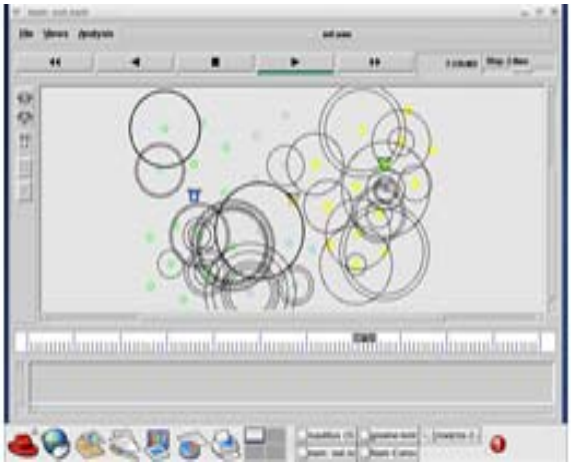

Figure-5. Efficient routing in MCRR protocol.

The Nam window result helps us to visualize the method used in our planned model (sink coverage movement). The efficient routing produced by selecting the multiple channel at different time slots using sink nodes. The proposed protocol uses the multiple channel sequence generation algorithm to provide the coverage area to the accessible channels.

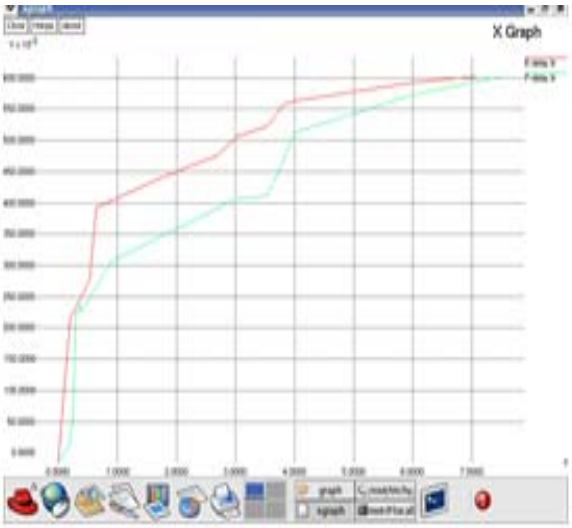

Figure-6. Through put vs propagation delay.

In this graph, X axis represents the energy values measured in joules and Y axis represents the threshold value. The increase in number of nodes will increase the propagation delay. If the energy level of the nodes increase then the propagation delay will be reduced therefore we can establish the efficient packet transfers.

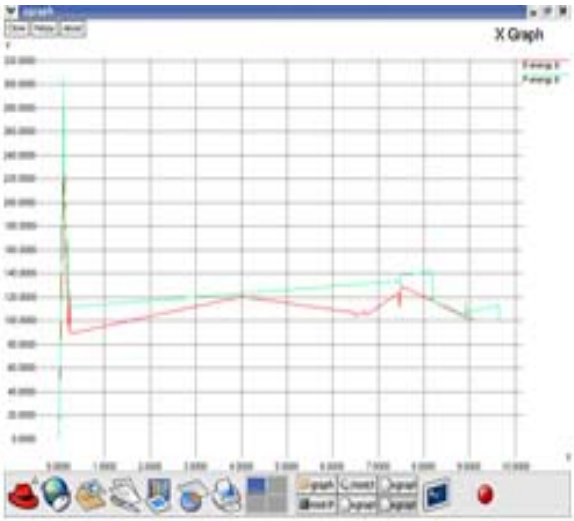

Figure-7. Energy delay vs propagation delay.

In this graph, X axis represents the energy values measured in joules and Y axis represents the threshold value. Propagation delay defines the time taken for transferring the first packet between the nodes with respect to the energy delay.

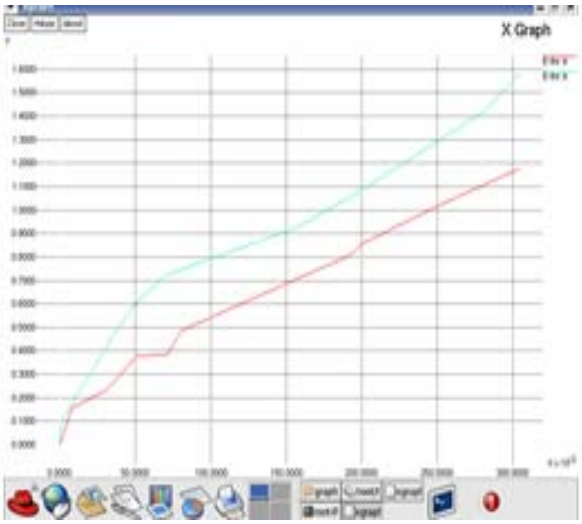

Figure-8. Energy vs propagation.

Here, X axis represents time in milliseconds and Y axis represents the number of packets transferred per node. The energy level consider here is up to 400 and packets transferred between the nodes will increase based on the energy level considered for each nodes.

CONCLUSIONS

In this paper, we have studied about mobile information about the different users used the different channel. The proposed algorithm makes it possible that multiple neighbouring users able to switch to the different channel. The implementation of mobile cluster based relay reconfiguration algorithm gives tremendous result when compared to the multiple channel algorithms. The Lifetime of the packet information and bandwidth get increased and also provides the active communication for longer time. The cluster head are used to coordinate the intermediate nodes. The intermediate node fails it should check the nodes of hat coverage area .The simulation have shown that there certainly is need for a special ad-hoc routing protocol when the mobility increases. The relay reconfiguration algorithm based on AODV have overall exhibited a good performance also when mobility is high .The overhead in the network quite drastically when he offered load to the network and the size of the network increases. In this situation, by hop- by hop method implemented by cluster head efficiently reconfigure the routing path using relay reconfiguration algorithm of AODV is more desirable.

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