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Methodology to Analysis and Development of Protocols for Clumping in Mobile Ad Hoc Networks

Lavanya Ratan [1,*], Dr. Raghav Mehra[2,*]

[1] Research Scholar, Computer Science Department, Bhagwant University Ajmer (Rajasthan),
[2]Professor, Computer Science Department, Bhagwant University Ajmer (Rajasthan),

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Abstract:

Ad Hoc networks are suited for use in situations where infrastructure is unavailable or to deploy one is not cost effective. Frequent changes in network topology due to mobility and limited battery power of the mobile devices are the key challenges in the adhoc networks. The depletion of power source may cause early unavailability of nodes and thus links in the network. The mobility of nodes will also causes frequent routes breaks and adversely affects the required performance for the applications.

In this paper, we have modified AODV routing protocol by incorporating link prediction algorithm using proposed link prediction model. This algorithm predicts the link availability time and even before the link breaks; either it repairs the route locally or send information to the source nodes to enable them initiating a new route search well in time.

Keyword: Closer Clump Detection Protocol & Algorithm, EECBA, BRAP.

Introduction:

Mobile adhoc network is one of the most common areas of studies in which a great deal of labor is being performed in this region to enhance service performance. One of the main things is that if nodes are closer each other than the match, the transmitting spectrum of nodes plays an significant function if a node does not form part of any community or if a node is separated. Improve network efficiency .

We use two methods: transmitting and selecting the clump head, using which we manage the network script. In our job, we are talking about how to define the transmitting variety of nodes, because of node mobility, when any node gets out of the range or node breaking with

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a node other than this node, its transmission is extended, so that interaction becomes simpler and the likelihood of information losing is reduced. First, because of the node velocity and travel range, we address the energy usage of servers.

By merely joining and leave nodes in the network, the mobile ad-hoc network became popular. MANET demand is quickly increasing and becomes more attentive compared with wired grids through decreased costs and enhanced technology. Several infrastructure requirements have not yet been implemented to meet the requirements of both industrial and users and clients.

Closer Clump Detection Protocol:

Clumping is one of the major concerns of networking, as network improvement and the quality of service provided by networking become a positive part of creating an efficient clump. Each server in this procedure advertises its private information to the network.

which is achieved through the use of a server within its broadcast scope. The recipient notices its neighbours and always changes its next table. This protocol is checked by Ns2 simulation before it is implemented.

Algorithm for closer clump detection protocol:

Step1: Start

Step2: Initially all nodes have same label.

Step3: Find the distance between nodes for each x, y D(x, y) = $\sqrt{(x2-x1)^2+(y2-y1)^2}$
If ((D(x, y) = min d (i, j)) Nodes divide into clumps. Else

Search for minimum distance Step4: Update clump

If (transmission range> max && distance>min) Nodes move toward to clump

Else

Nodes within a clump

Step5: If all nodes get clump procedure stops Else go to step2

Step6: Exit

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Flowchart for closer clump detection protocol:

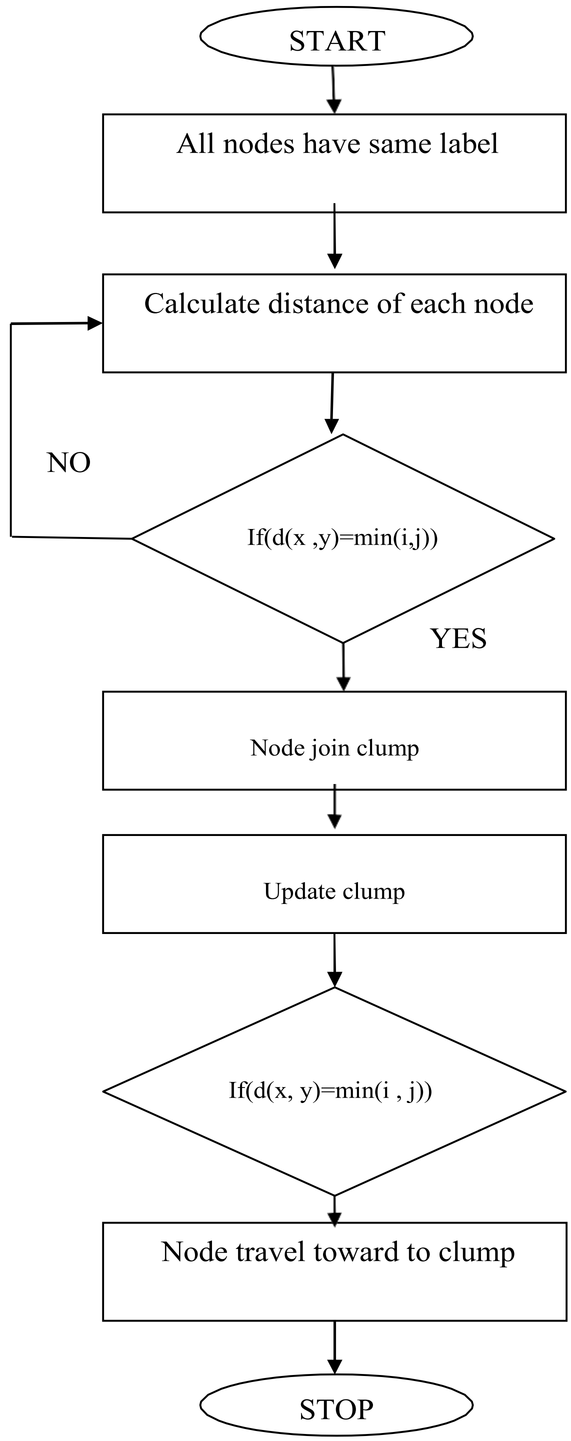

Figure 4.1: Flow Chart Of Clumping Algorithm

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Energy Efficient Clumping Based Algorithm (EECBA):

The current scheme only uses a procedure depending on the clumps. This algorithm is not integrated in clump head choice energy-based ideas. The job is a clump head choice depending on electricity. To transmit the packet, this algorithm uses the AODV routing protocol. This system is only use energy based clump head selection algorithm that means when the clump head energy is low that time do not transfer packet so that clump selects the substitute clump head which have high energy in there clump.

The energy effective clumping algorithm calculation is based on clump head weight. This method is carried out according to weight laws and is called energy efficient clumping algorithm depending on weightage (WB-EECBA). It improves predictable CBA. It improves. In this protocol, the weight of each node is measured as metric (distance, speed, node mobility, energy consumption of node etc.) for Clumping head selection and these things of each node can be calculated as:

Step1: Find the distance of node in n time.

.... (1) $D_v = \sqrt{(x_{new} - x_{old})^2 + (y_{new} - y_{old})^2}$ ....

Where x and y are the coordinate of nodes.

Step2: Find the speed of the node

Speed = D_v/n ....(2)

Step3: Find the node mobility of the node

.........................$\Delta m = \delta - \widehat{\delta}_m$...

Where δ and δ_m are the moving parameter

Step4: Calculate power of the node (energy consumption of node)

$P_{av} = P_{ini} - (transmittedata)$*distance .... (4)

Step5: Calculate the weight of the node

W = x1*Δm + x2*...(5)

Δm..

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Clump Head Election: The nodes exchange hello packets when interaction begins so that we calculate the clump head on the base of electricity and node weight. The following is the file transmitting and receiving format:

Table 4.1: Clump Node Information

MID	MWT	MDIST	MTR

Where MID is clump member ID and MWT is weight of clump member, MDIST, distance of members, MTR member of transmission range.

If (energy > threshold && MWT > MWT[i])

{

Node become clump head

}

Clump head election flowchart using energy or weight of nodes is given below

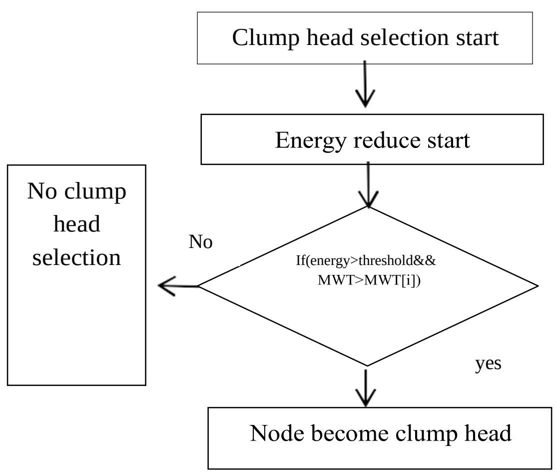

Figure 4.2: Flow chart: clump head selection

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Broadcasting Range Adjustment Protocol (BRAP):

The BRAP has been suggested, which allows distant nodes to control their ranges in order to remain connected with present clump heads. Improve the transmitting variety of the node, which is unattainable and secluded. We use form 6 after that to find isolated.

Step1: Degree = $\sum_{1}^{N} n \,/\, {}_{2}^{n}P$ ………………………… .... (6)

Where: P is a possibility that a single node connect

Step2: Find node isolated or not

```
if (degree == null)
{
node in isolated condition goto step3:
}
else
node within clump
```

Step3: Increase node transmission range

NTR = $R + \Delta R$……………..(7)

Where NTR is new transmission range and R is old transmission Range and ΔR is new updated value of transmission range go to step1.

Step4: Calculate differential value of transmission range

$=\frac{\partial R}{\partial t}$ ....ΔR ……… …...(8)

Where ΔR is differential value of transmission range with respect to time?

Step5: When node has degree one that means communication of this node starts so we stop increasing transmission range.

Step6: Exit.

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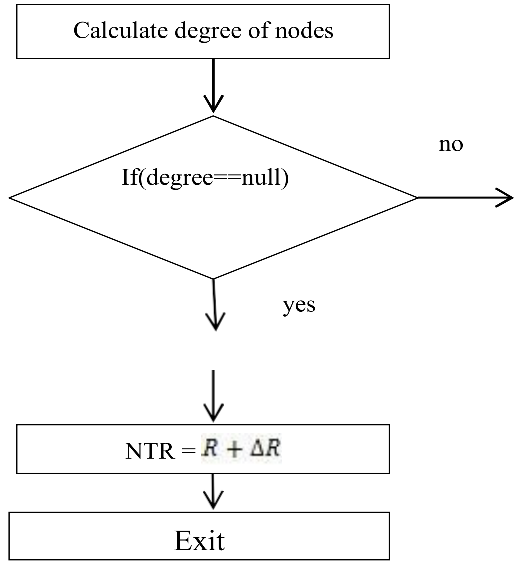

Figure 4.3: Flow Chart: Broadcast Range

Results

Performance: number of pieces per second transferring the channel, increasing performance shows that bandwidth use is large.

Performance= number of pieces per second transmitted

Figure 4.4: Throughput Graph

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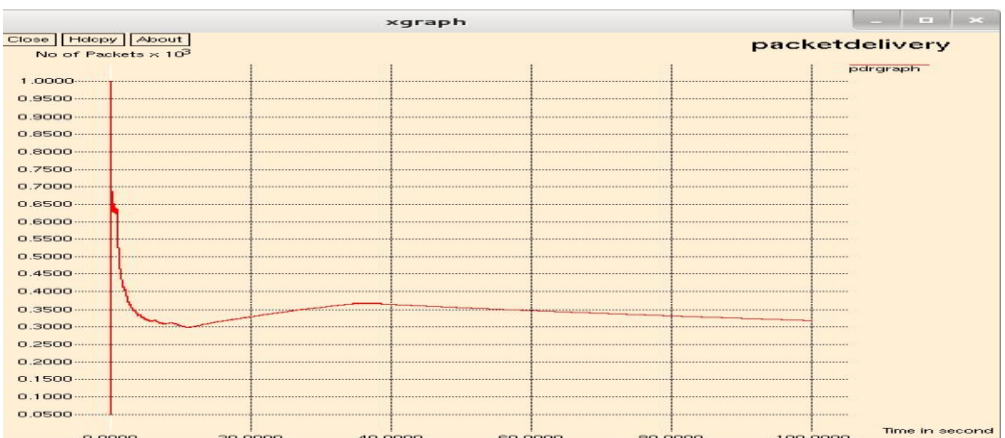
Mobile Adhoc networks are extremely vibrant networks. Routing overhead. In such networks, the quality of service (QOS) transmission is generally reduced by network breakdowns because of either node mobility or mobile device power depletion. The QoS routing is also a matter of overhead routing.

Figure.4.5: Routing Overhead

The transaction distribution ratio is described as the number of packets received compared to the number of packets sent. Packet distribution ratio The percentage of packet delivery also increases when network performance improves.

Packet delivery ratio = $\sum(RECEIVE/SENDS)$*100



<u>Figure.4.6: Packet Delivery Ratio</u>

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Energy: The strength and vitality required for sustained physical or mental activity.

Figure.4.7: Energy of Network

Network life time: How many nodes alive in network at the end of simulation.

Figure 4.8: Network Life Time

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Conclusion:

Numerous parameters together with delay, performance, the package supply ratio and energy consumption and network life are explored for energy efficient clumping. The boom within the broad range of hops will improve the duration of the backbone of the network. This may increase the end to end delay in conversation for the packets. The suggested protocol for adjusting the transmitting variety (BRAP) enables distant nodes to

become attached to current clump heads rather than fresh heads. The delay is reduced by reducing the number of clumps in the networks. The procedures in this document deal usually with the clump creation, retention of the clumps and bacterial power usage that can extend in future to several distinct clumping region such as load balancing many the clump head, fault tolerance or privacy the algorithm of clumping is performed. Energy Efficient clumping based algorithms that boost clumped nodes ' lifespan depending on their mobility and power cost. This study piece focuses on the retention and development of clumps at a small pace of mobility and power.

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