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# Energy Efficient Cluster Head Selection Basis of Distance in MANET

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**Abstract**— MANET (mobile advert hoc networks) is a group of wireless node that can vigorously form a community to conversation information deprived of using any pre-present static network infrastructure. MANET is special aspects of cell advert hoc networks deliver these technology satisfactory possibilities together with severe challenges. This thesis describes the fundamentals of (MANET) ad hoc networking with the aid of giving its concept, features, and functions of the MANET. One of the vital technical challenges (MANET) mobile advert hoc network poses are presented. AODV (Ad on Demand Distance Vector) and Dynamic supply Routing (DSR) which don't use cluster founded mechanism for routing we enhance the property of this protocol or examine the outcome with the present system. The results offered on this thesis illustrate the value in cautiously evaluating and implementing routing protocols when implementing an ad hoc community protocol. Implementation of our work simulated on NS-2.35.

**Keywords**— MANET; clustering; etc.

## I. INTRODUCTION

In dynamic networks where information entry is mission significant, equivalent to mobile ad hoc networks (MANETs) used during rescue operations, one wants to find a magnificent solution for position of services and data. In such element situations clustering, i.e., the process of opting for clusters of linked nodes in a network can be utilized to optimize replication and migration processes. It's major to identify clusters with low variability and lengthy lifetime, which is able to then be utilized to receive spatial-temporal data availability and reachability. Nonetheless, clustering of dynamic networks has been an awfully challenging task due to the ever-altering topology and irregular density of such networks.. Clustering of irregular and dynamic networks wants to partition the network right into a variable quantity of clusters, with variable number of nodes and without topology constraints. The majorities of MANET clustering algorithms are designed for packet forwarding purposes and are consequently built-in with the routing protocol. Consequently, they are not customized for problems like data placement, availability, or reachability of data in the network. To construct a useful, cluster structure for service placement and data ferry selection, the network evolution must be taken into consideration. Administration situation seeks probably the most steady structures in the network to situation replicas

in the community, i.e., Data ferry determination searches mobile nodes that through their actions can physically transport the data to other constituents of the network, i.e., nodes that typically change cluster affiliation [1].

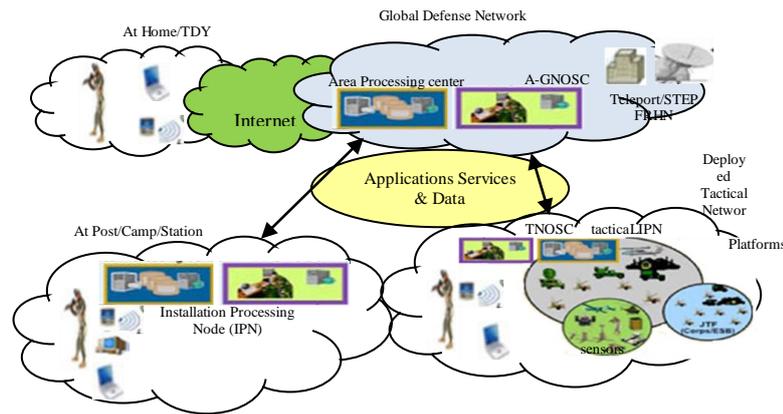


Figure 1. Basic structure of MANET

MANETs are thoroughly autonomous wireless temporary networks founded utilizing a cluster of mobile nodes suitable for environments where not present any constant network organization. In contrast to constant rough-wired networks with physical defense at firewalls and gateways, attacks on MANETs can come from all directions and may target any node. Due to the dynamic topology of the networks any security arrangement with static configuration are not sufficient. Any node must be prepared to operate in a mode that need not immediately trust other nodes without their trust information. If the trust relationship amongst the network nodes is available for every cooperating node, it will be much easier to select proper security measures to establish the required protection [2].

Since a cluster structure is an average hierarchical architecture, Cluster based Routing protocols can be used for the routing in MANETs. The CBRP has the next features:

- It's a thoroughly scattered operation
- It reduces the flooding site visitors.
- It repairs the broken routes in the neighborhood.
- It shortens the Sub Optimal routes.

The routing protocol must be such that it might cope up with the changes in the network topology. Along these lines, by isolating the network into clusters, now the ways are recorded between clusters then again of amongst nodes and these raises the routes lifetime.

Clustering also the development network capacity and decreases routing overhead which brings additional effective and efficient routing in MANET. Each clustering algorithm comprises of two components, cluster arrangement and cluster upkeep. In cluster arrangement, cluster heads are picked among the nodes to kind the hierarchical network [3]

## II. CLUSTERING

Clustering is a system for dividing the network into a distinctive cluster of nodes and manages the transmission of the info among the interacting nodes. Each cluster is often called cluster. All CH are interconnected with each other for reliable communication like limited energy resources are existing. Each cluster is an architecture in which the cluster head (CH) responsible for maintenance of cluster and communication between the cluster nodes. Cluster head decision involves two variables-

- Distance restrained determination-in step with this decision approach, every node in a cluster ought to be located at the exact distance from cluster head which is nearer to it.
- Size Constrained Selection-Acc. To this, all cluster in a network must have some members. Clearly 3 varieties of nodes are rewarded in a cluster.

- Cluster Head-it is a leader node that creates co-ordination amongst nodes, continues nodes and course list to all node in a cluster.
- Cluster Member-It is part of a cluster that transmits knowledge to their cluster heads which further compresses the know-how bought from cluster member and forward it to various cluster heads and the BS.
- Cluster Gateway- Its principle reason for existing is to interface one cluster to another cluster and forward the data among clusters. Entryways are fundamentally non- cluster heads.

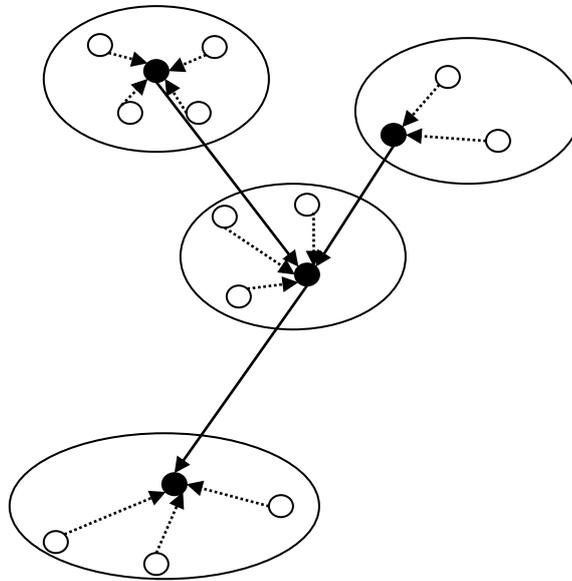


Fig 2:-Basic diagram of cluster

Here correspondence done in 3 stages:-

- i) Firstly cluster head gets information from its cluster individuals.
- ii) Then it knowledge packs.
- iii) After this, it at long last transmits data to BS or numerous cluster heads.

Advantages:-

- i) Scalability.
- ii) Routing Control Overhead abatements.
- iii) Amount of routing data diminishes.

### III. CLUSTER HEAD SELECTION

In this we select a node as a leader node. At first, all nodes act as cluster heads and so they transmit hello messages. These messages are acquired via each of the nodes from its neighboring nodes. At the point when any node gets a hello message from neighboring nodes then it gives a brand new section inside the neighbor table. When hello messages are obtained from all neighbor nodes then it assigns a priority to each node in step with power degree and total no. Of nodes reward. Then it compares the electing node with perfect precedence with itself, if the precedence of electing node is larger than that node's precedence then it acts as a cluster head. Else if need is not more prominent than node itself goes about as a cluster head.

Selection of node done on the basis of following factors:-

- Location of a node among other nodes.
- Mobility
- Energy
- Trust
- Throughput

Traditionally cluster head selection entails following steps-

Firstly, we setup the edge value and most effective those nodes will perform as cluster head whose value is higher threshold value.

When the node with is selected as the cluster head then the counter time must be set up for that node to stay as the cluster head for a special period of time.

After time out of the primary node, subsequent maximum energy level among the many nodes might be checked and the following node with highest power stage might be chosen because the cluster head.

If in between new node arrived then the energy level of this node also be measured and compared with the threshold value.

#### IV. SECURITY IN CLUSTER MANETS

Security is a main issue in information routing between various clusters. There are no. Of aggressors prize which finds the identity of the cluster nodes, drops the correspondence. There are no. Of assailants prize which finds the character of the cluster nodes, drops the correspondence the data gathered by aggressor is helpful for making attack plans for the Certification authority node and disturbs the overall cluster process. So in order to provide security and protect the identity of individual node some techniques like threshold signature must be used. Threshold signature involves of basic operations like generation of pairing parameters, private keys. An algorithm like Trust based CH election is exploiting for endow security by computing TRUST VALUE from the neighbor nodes. Each node collects the trust values which help within the resolution of cluster head and improves the authentication and confidentiality [4].

#### V. LITERATURE SURVEY

In [5] a better protocol for cluster head selection and compare our results with LEACH protocol which is generally on an energy basis by considering different parameters like transfer speed, energy and blacklist status of node.

In [6] research the issues of cluster head determination for extensive and thick MANETs. Two variations of the cluster head choice are analyzed: (1) the separation obliged choice where each node in the network must be situated inside a specific separation to the closest cluster head; and (2) the size-compelled determination where every cluster is just permitted to have a foreordained number of people. We show that the issue of minimizing the course of action of cluster heads is NP-hard for both variations. We propose two distributed selection algorithms, each having a logarithmic estimate ratio, for these variations.

In [7] ART1, an unsupervised learning system of the counterfeit neural network has been implemented to select the cluster head in routing. Simulation result present that 58% network lifetime improvement is attained.

In [8] Cluster head choice considering neighborhood commitment and normal least power are proposed in this paper. Parameters considered for weight calculation contributed to the stability of the clusters. Although the requirement varies between different networks the weight estimation remains same and the weight factors can be changed to use the prominence of a particular parameter. Avoiding the nodes which have less number of neighbors and energy compared to other nodes will reduce the overhead in selecting the head. It is made known that most optimum cluster head can be selected using the proposed method. Future work is to focus on route maintenance using optimization techniques.

In [9] proficient ENB cluster head determination algorithm in light of the mix of imperative matrices Residual Energy Energy (E), Node connectivity (C) and Available Bandwidth (B) for choice of the cluster head effectively in MANETs.

In [10] paper is mostly focused to launch a newfangled clustering method by which it is possible to advance routing present protocols performance. Another vital part of this paper is to give a cluster head choice calculation which can adequately keep up the clusters and gives more solidness. Proposed clustering thought is valuable for topographically related nodes adequately in various turf of routing. To keep up the clusters and their stability, it gives another thought to choose a cluster head inside the cluster, likewise the race of auxiliary cluster, head for staying away from further race quickly after the inaccessibility of essential cluster, head. This thought is assessed in network simulator and it outflanks the current clustering methods.

In [11] Clustering is one of the most promising methods for organizing and maintaining hierarchical logical topology of the MANET. But the field of hierarchical clustering protocols design still requires finding stable and efficient clustering protocol that uses practically obtainable weighted metric. Also we think that key advantages of these protocols are able to adapt the protocol to various usage scenarios and possibility to use them as a tool for cross-layer stack optimizations.

In [12] communication should do in very less time. The various techniques are available to make a cluster. Battery life, speed, packet delivery ratio, delay these are few significant parameter thru that we can create efficient algorithm. This survey paper focuses on the Comparison amid Highest Degree (HD), LEACH (Low Energy Adaptive Clustering Hierarchy), Lowest ID (LID).

In [13] efficient clustering method has been proposed which is being used for Super Cluster Head election and Cluster Heads. It uses five parameters, i.e. Correspondence range, Hop Count, Battery Power, Relative Velocity, Fairness at once to choose a Cluster Head. Always an efficient node which passes all of the criteria will become the Cluster Head. After the choice of Cluster Heads, the race is performed to choose a Super Cluster Head. A node is selected as a Super Cluster Head only if it is having maximum battery power and it is not a Cluster Head. The technique used chooses the best of the nodes to become Cluster Head and Super Cluster Head.

In [14] technique for cluster head selection is based on fuzzy logic using three parameters such as node degree, goodness factor and competent level.

The proposed protocol enhances the execution of the network, minimizes the re-decision time of cluster head and decreases the overhead over the network.

In [15] new discoveries on the many-sided quality of the cluster head selection algorithms. Two variations of the cluster head choice are inspected: (1) the separation compelled determination where each node in the network must be situated inside a specific separation to the closest cluster head; and (2) the size-obliged choice where every cluster is just permitted to have a predetermined number of individuals.

We demonstrate that the issue of minimizing the arrangement of cluster heads is NP-hard for both variations. We propose two distributed selection algorithms, each having logarithmic estimate proportion, for these variations. We likewise examine, utilizing NS-2 reproductions, the subsequent cluster size dispersion and cluster head thickness, which affect the productive operation of the network.

In [16] keeps up the data having run-down of nodes, way of every single node identified by its comparing cluster. Proposed algorithm frame's cluster head which is for energy protection by considering battery power and neighbor mobile node availability level.

## VI. PROPOSED WORK

The study of various disorders in mobile advert hoc networks have become repute considering the fact that of its difficult nature and all time connectivity to be in contact. MANET (cell advert-hoc Networks) is a random deployable network where contraptions are mobile with dynamic topology. Within the community topology, each gadget is termed as a node and the digital connectivity among each node is termed because the link. Nodes in a community is dynamically geared up into virtual partitions called clusters. Community simulators provide the platform to analyzes and imitate the working of pc networks along with the usual contraptions, traffic and other entities.

In we recommend work we apply variety or region centered cluster system where we first discover the region of every node and calculate the energy of nodes on the basis of vigor and quantity of neighbours we decide cluster head cluster head keep up a correspondence simplest with cluster head.

Algorithm:

Step1: initialize network()

Step2: if(range) {

Node become neighbor

Update routing table }

Step3: renergy = inienergy-lostenergy

Step4:  $L = \sqrt{(xl - xi)^2 + (yl - yj)^2}$  // location find

Step5: on the basis of L create cluster

Step6: if((density>high)&&(energy>above)) {

Node become cluster head }

Step9: exit

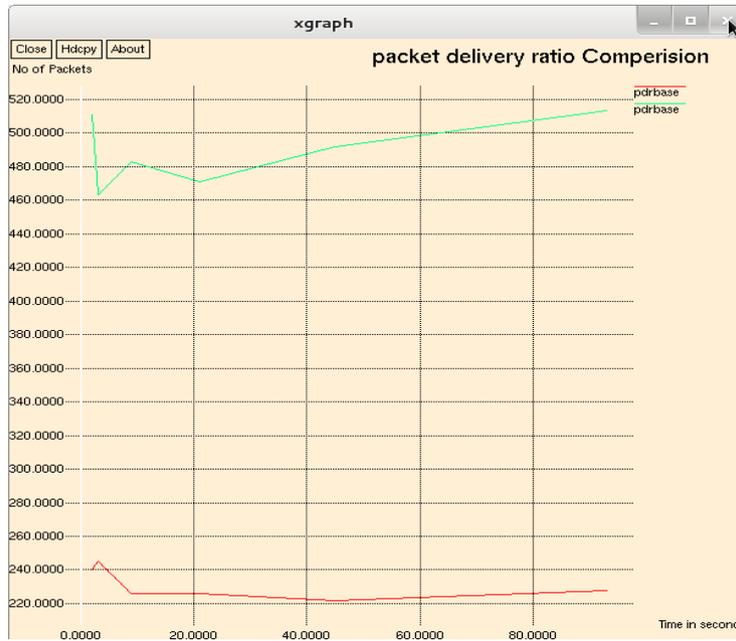
**VII. RESULT SIMULATION**

Packet delivery ratio:

Defined as packets delivered ratio from source to destination. The graph 1 represents a PDR graph between base approach and the proposed approach. The PDR of proposed method is higher than previous method.

Time	Base	Propose
2	240	511
3	245	463
9	226	483
21	226	471
45	222	492
93	228	513

Table 1. Packet delivery ratio base and proposed time



Graph 1. Packet delivery ratio

Throughput:

Per second transfer of data on bandwidth is known as throughput. The graph 2 represents a throughput graph between base approach and the proposed approach. The throughput of the proposed approach is better than the existing approach.

Time	Base	Propose
2	1221	2968
3	1636	3233
9	564	4417
21	249	2923
45	159	1475
93	101	7299

Table 2. Throughput base and proposed



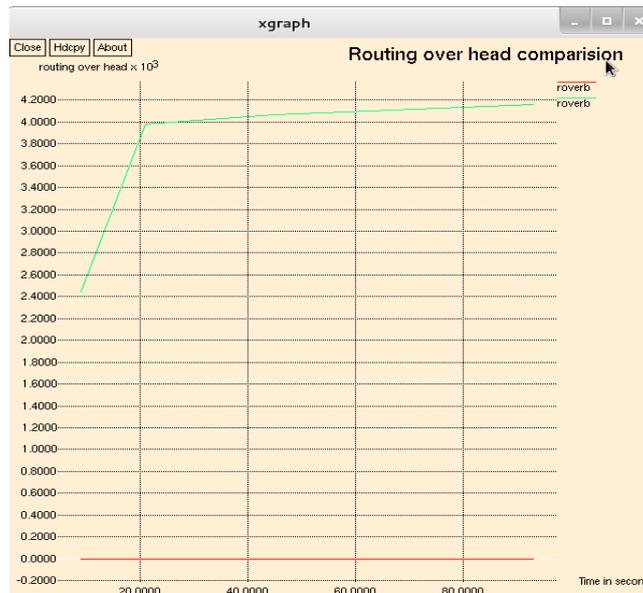
Graph 2. Throughput

**Routing Overhead:**

The routing overhead is defined as data of data and flooding of data in the network transmitted thru an application, that exploits a bit of accessible transfer rate of communication protocols. The graph 3 represents a routing overhead graph between base approach and the proposed approach. The overhead of the proposed approach is more than the base approach. Since the overhead should be minimum but as the routing increases in the proposed work the overhead also increases.

Time	Base	Propose
9	0.129	2443
21	0.139	3982
45	0.306	4070
93	0.306	4157

Table 3. Routing overhead



Graph 3. Routing overhead

## CONCLUSION

MANETs furnish mobile, multi-hop, wireless networking in the face of dynamic topologies and bandwidth-restricted, variable potential links, but require contemporaneous end-to-end paths between the source and destination nodes with a purpose to efficaciously transmit messages and as such are higher applicable to small networks corresponding to an office environment. We enhance the property of this protocol or examine the outcome with the present system. The results offered on this thesis illustrate the value in cautiously evaluating and implementing routing protocols when implementing an ad hoc community protocol. Implementation of our work simulated on NS-2.35.

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