International Journal of Scientific Research & Engineering Trends
Volume 6, Issue 4, July-Aug-2020, ISSN (Online): 2395-566X

A Clustering Algorithm Based on Topology Adaptive Distributed: A Comparative Study

Dr. Akhilendra Kumar Khare,
AIM & ACT Banasthali Vidyapith
akhalendra@yahoo.com

Prof. Chandra Kumar Jha
FMS WISDOM Banasthali Vidyapith
ckjha1@gmail.com

***Abstract*- This Paper measure the performance a TACA (Topology Adaptive Clustering) Algorithm that aim to choose least integer of group heads to play down the numerals of hubs within the essential back bone.To memorize its one-hop neighbors algorithm uses the Neighbor Detection Protocol (NDP) . The algorithm which is dispersed in environment that reviews only the confined topology to choose a group head. Specifically, hub having the maximum weight between its one-hop neighbor is chooses as the group head. Average mobility and its available battery power is assuming only by calculated node weight. This paper moreover bargains with the vitality utilization of the distinctive portable hubs in different working modes. The cluster support techniques to back the hub portability in addition to hold the cluster control structure are too incorporated in this paper.**

***Keywords*- Neighbour detections, cluster maintenance, volunteer head, re-affiliation,re-elections, network life time.**

I.INTRODUCTION

Grouping in portable ad-hoc systems is the method of dividing the hubs onto coherent bunches. It may be plan to the method of chart dividing with a few included imperatives. Clustering comes about in electing a vertex set H ⊆ V(G) known as the overwhelming position wherever each part of the prevailing position H controls the duty of bunch head for the bunch. On the off chance that Δ(h) is the level of joins related with the head h and |h| is the multiplicity of 1-hop individuals of h, at that point |h| ≤ Δ(h). This demonstrates that a hub that's actually inside the broadcast extended with includes a interface to the group head might not be a part of the group head. Here allows a case of non-overlapping coherent clusters. Be that as it may, the union of the individuals of all the clusters comes about within the entire organizes [1]. Numerically, on the off chance that h€H and Γ(h) is the position of 1-hop neighbors of h at that point H ∪ Γ(h) = G.

II. BEGINNING OF THE PROJECTED ALGORITHM

The Projected TACA algorithm is defined through the following properties

1. Transmission range of the nodes in the mobile ad hoc network able to modify. Rangemax is indicating the upper limit allowable transmission of a node can process. To manage the network topology by enables the node to regulate their transmission range the reason of enabling the nodes to regulate their broadcast range is to manage the network topology while all the nodes go freely surrounded by it.
2. Elsewhere of a number of arguments of the devices in the MANET, movements of the nodes is measured the key challenge. Frequently varies the node connectivity. Consequently, a recurrent change the topology of the network. When the topology change is bigger the node movement. Likewise, the battery power of the lightness weight node is one most important constraint. The growth of techniques for energy resources is a lot slower than network devices corresponding item. Together of these arguments decide the steadiness of the group as well as the network. Therefore, in the projected algorithm these two components are chosen as the weight making components for the nodes.
3. While the network is activated the method of choice of group head is take place. The volunteer group head is a collection of preferred group heads.
4. Battery power of node is completely than this node is idle and it is not involved in the network. As a effect,

dispersed the topology network. Therefore, in sequence to use the node battery power efficiently, the nodes obtain approximately comely probability of allocation as group heads, so that load on individual nodes might be keep off.

III. COMPUTATION OF THE NODE WEIGHT

Due to movements of nodes transfer the network topology regularly while successively strangle stability of the network. As a result, selection the fewer dynamic hubs for the creation of the effective keystone are favorites. It is ascertain improved mainstay immovability. Likewise, the restricted battery power devices have their energy and happen to departed even as direction-finding the packets from side to side them. This de-links the way for packet direction-finding and burden for additional organization of routing backbone. So as to make sure the ease of use of routers in the routing keystone, hubs through extra obtainable battery power are selected as keystone making nodes. Observance these components in brain, the weight of the nodes are deliberately by consider for the hub mobility and its obtainable battery control as the type values. Maximum allowable speed of a hub in the network to be presented in is . Therefore, the mobility issue of all nodes is measured by calculating the difference of δ and its usual speed throughout a assured time interval. A bigger mobility part suggests a hub by a small amount of mobility and vice versa. The obtainable battery control is power connected with the hub at the immediate of load calculation. These two arguments are extra with dissimilar load part to discover the someone hub load. Now the following points for computing the loads are described below

Step1: A node covered the whole distance through most recent n instance units a

$Dv= \sum_{i=t-n}^{i=t} distv$,wherever t is denoted the present instance. So, standard speeding of a node is calculated as Sv =Dv/n.

Step2: Calculate Motility feature ΔM=δ-Sv. This refers the dissimilarity of the standard speeding of the hub as of greatest allowable network speed δ.

Step3: Calculate obtainable battery power as Pav =Pav-Pcons

Wherever Pav is denoted battery power of the hub.

Pcons is indicating battery power obsessive by the hub.

Step 4: Calculated the mass of the hub like

$WT(v) = x1\Delta M + x2\, P_{av}$ (1.1)

Wherever x2 and x1 are indicating mass components that are normalized so that x2=x1 =1. The load components designate the most important restraints of a network.x1 known as maximum value and for energy restraints network x2 might be specified the upper value in favor of extremely dynamic network.

IV. EXCERPTION OF VOLUNTEER CLUSTER HEAD

Other algorithm is proposed to calculate the influence of the nodes is called ahead to go for the set of volunteer group heads. A pseudo-code segment of algorithm is accessible beneath.

```
"Begin
….
For (every v€V)
{
  If Wv>Wi where i€ Ѓ(v)
    Then set head =v
    For (every x€Ѓ(v))
    {
      If (STATUS(x) =0 then
      Set HEAD(X) = head
    }
}
….
End"
```

The algorithm indicates that a node having maximum weight among its 1-hop neighbor declares itself as the volunteer cluster head. And its 1-hop uncovered neighbours (i.e. whose role is not yet decided) become the member of the volunteer head. The set of covered nodes are exempted from taking part in subsequent selection procedure and this process is repeated till all the nodes are assigned with their role either as cluster head or a cluster member. During the cluster head selection phase every node broadcasts its ID along with its weight WTi to the nieghbours and stores the weight WTj that it hears from other nodes. It is understood that every node has neighbor table NTAB that stores the list of neighbours of the node which have been learnt by the execution of the NDP discussed in the last chapter.

If a node does not hear another node with weight higher than its own weight then it declares itself as a volunteer cluster head and its 1-hop uncovered neighbor nodes become its members. In case of a tie in the node weight the lower ID node is preferred for the node of cluster. Unlike the re-affiliation issues of DMAC algorithm discussed by [2] where a node resigns its current head after finding any higher weighted node within the proximity in the current algorithm a member node remains affiliated within a cluster head unless either of them go out of range of each other or the head drains out its battery power. This reduces the number of re-affiliations lowering the cluster maintenance overhead. The example of volunteer cluster head setup phase of proposed algorithm is demonstrated with help of figures. In figure 4.1 every node is identified with a unique ID and its associated weight in parenthesis.

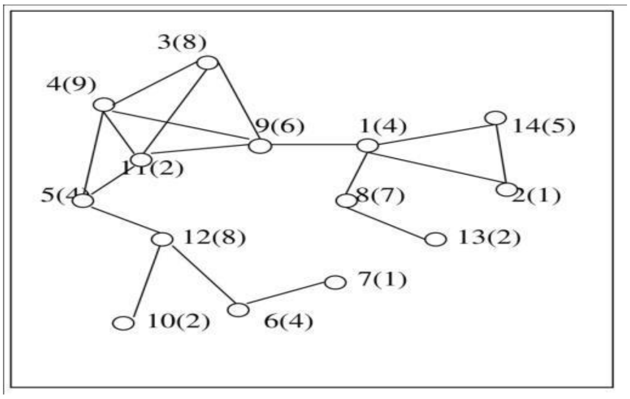

Figure 1. Early Topology of hubs once computation of weight

In the figure 2. solid circle in the network recognized the volunteer group heads after of own weight inside the local topology. I have already calculated the free weight for all the nodes. All the nodes are within the transmission range when they are connected and setup two-way links among them.

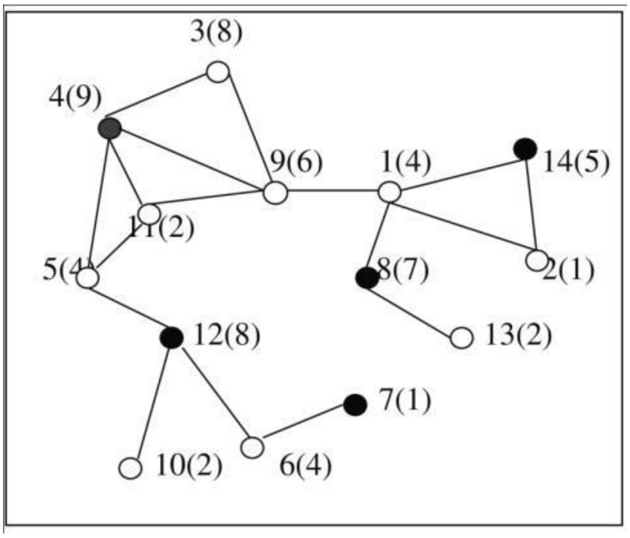

Figure2. Early cluster heads are recognized as solid circles

Subsequently to initial groups are created the network shown in the figure (3).A hub induced the maximum mass between its 1-hop neighbours get the head and its instant revealed neighbours get its members.

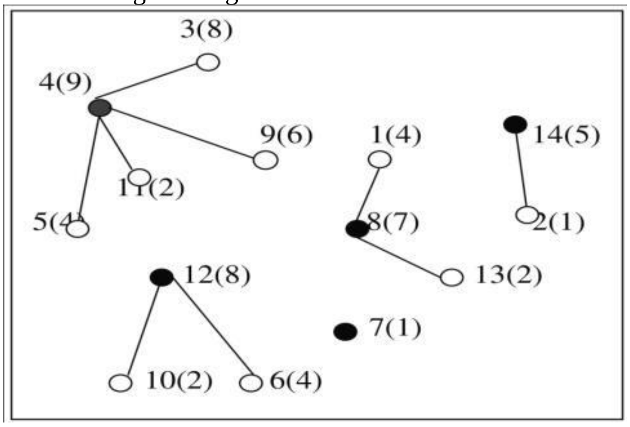

Figure 3. Clusters are formed

The entire node has cluster table in the network.Cluster Table Data Structure is given below

MID	MWT	MDIST	MT

MT: -Member Transmission Range
MDIST: -Member Distance
MWT -Member Weight
MID -Member ID

The table of cluster is modernized by the happening of hub re-association with re-choice. It connotes while associate of the present head reach beyond its broadcast series. This is removed from Cluster Table and at the similar moment original row is further while an original hub becomes the member of the cluster. This is revealed in image 1.3 to facilitate a few cluster head have 4-members as in the case of head 4 wherever zero member associated with the head 7.This is shown in the fig 1.2 that node 12 and node 7 has connectivity to node 6. Now it is seen that the head 7 having lees weight than the head 12 within its range and it is also affiliating member to 12. Without having any cluster member this leaves nodes 7 as separated node. Node 5 and 1 having also in the same situation and node 4 and 8 affiliated to both of them in malice of having integration to bunch head 12 and 14 correspondingly. Therefore, it is implicit that a hub forever prefer to link a elevated weight hub if it is get additional than one head in its closeness.

V. PLANNED ENERGY SPENDING MODEL FOR THE AD HOC NODES

Wireless network able to work either in ad hoc mode or in base station mode according to IEEE802.11 [2]. All the node in the base station mode is in the broadcasting range of single or more base station which are accountable for soften and furtherance transfer among the nodes. Nodes that desire to broadcast be able to send forthcoming dealings to the base station any time and be able to get the entering passage from the base station by polling it occasionally. In the rest of the time node become the idle in this state interface must active in order to receive and send the traffic. The certain accessibility of predetermined communications like BS for soften and traffic management reinforcement energy preserve allowing the some nodes to go into the sleep state.

Few base stations does not utilize in ad hoc mode procedure. Finally, unreachable nodes using the dynamically computed routes and node in the network immediately communicate with one hop available nodes. On the other hand, a node can go into idle state while it neighbors broadcast nor get any congestion. Utilization of energy in the receiving traffic almost the similar it is continually listening to the wireless media uses up energy. Therefore power utilization of the movable devices depends on the running style of its radio network interfaces. We assume the energy to be the mobile node power. Utilization of battery power is another form of node energy utilization. Therefore ad hoc network wireless may be work in the following mode.

- **Transmit: -** Transmission data
- **Receive:** Accessible data
- **Idle:**a evasion style while the hub is prepared for send and collect

An easy one-dimensional design can be consider for the energy utilization cost of dynamic hubs for transfer or getting packets. Per-Packet energy cost is comprise of an incremental cost m connected with the size of packet and fixed cost c connected by the channel attainment to analysis the broadcast communication as[3].

$$Energy = m_{send/receive} * Size_{packet} + C_{broadcast} \quad (1.2)$$

Within a transmit passage the correspondent listen concisely to the strait. If the channel is establishing to be open after that in wireless range the package is received and sent by the each node. The end hub processes the packages wherever as the no end nodes disregard it. If the guide is established busy, the dispatcher has no option other than to move away and repeat afterward. In the present clustering algorithm, the bunch member sends or received the packet openly to/from their bunch head.

Referable to the propagation situation, while a bunch element broadcast, its neighbors non-destination hubs (called the showing terminals) more here the CST data packet and message. Being the non-destination nodes they have some quantity of energy in removal these overheare packets. In the same way, the nodes in the same series of the end hub (Called the unknown Terminals) hear the RST communication and the information packet .These nodes also utilize a few energy in removal the eavesdrop packet. Therefore, it may be completed that, the whole power utilization for the bunch members contain the power utilization for small package broadcasting and throwing away the eavesdrop packets for the hubs .The sum of power utilization by the members for removal the overhear packets is presented in the equation 1.3 as [3]

$$Energy_{discard} = \sum_{n \in sender} C_{discardRTS} + \sum_{n \in dest} C_{discardCTS}$$
$$\sum_{n \in sender} (m_{discard} * size_{packet} + C_{discard}) +$$
$$\sum_{n \in sender} C_{disccardACK} \quad (1.3)$$

In sort to keep away from the difficulty of model the power utilization for removal the overhead manage packets like ACK or CTS/RTS might be unobserved. Additional in the most evil case:

$$m_{recv} = m_{discard} \text{ , } c_{recv} = c_{discard} \quad (1.4)$$

So as to non-ending hubs now find the packet and disregard them .At this time the equation (1.3) may be re-scripted as:

$$Energy_{discard} = \sum_{n \in sender} (C_{recv} + m_{discard} * size_{packet}) \quad (1.5)$$

Combination of the equation 4.5 and equation 4.2 we proposed the last power utilization model used for the group member as:

$$Energy = m_{send/receive} * Sizepacket + Csend + \sum_{n \in f(neighbors)} (mrecv * size + Crecv) \quad (1.6)$$

Wherever the foremost element of the equation 4.6 explicates the power utilization in the definite communication of the data and second part explicates the power consumption in the hear to overhead packets.

“The condition is little bit unusual for the cluster head. In addition to the work of furtherance the small package to and from the cluster it has an extra work of source management for its members. Therefore the rate of utilization of energy is comparative to the number of member nodes process by the cluster head. Furthermore, the broadcasting range coverage by the head node has a considerable outcome on its power consumption. Depending on the RF situation the power utilization can differ from P2v to P4v where pv is the communication power utilized by the head node in communication a one-hop neighbor inside its cluster [4].While the distance among the nodes in a cluster is measured to be very little so linear recounting between the transmission power and energy utilization of head node is understood in this work. As a whole the energy utilization of a cluster may be consider to depend on the following parameters.

- The traffic forwarded by the head
- Number of members process by the head
- Whole communication powered utilized by the head in helping the members

Therefore allowing for the on top of three constraint, an power utilization model for the cluster heads can be projected as:

$$energy_{head} = f(energy_{|ni|}, energy_{traffic}, energy_{transpower}) \quad (1.7)$$

Have the numeral of member’s process by the cluster head ni is outlined as its cardinality |ni|. If the cluster head utilize single part of battery power per member then the total energy utilized by the group head for working |ni| member is:

$$energy|ni| = |ni| \quad (1.8)$$

The dealings handled by the cluster head show the amount of data that is transmissible or received by the head for its members. Therefore the energy utilized by the cluster head for forwarding the traffic can be projected as:

$$Energy_{traffic} = m_{send} * \sum traffic_{send} + c_{send} + m_{recv} * \sum traffic_{recv} + c_{recv} \quad (1.9)$$

As discussed previously, the energy utilization by the cluster head is job of the transmission power utilized by the head in communication its one hop member .Due to the transmission power utilization the energy consumption can be proposed as:

$$energy_{transpower} = energy_{unitdistance} * \sum_{i' \in Ci} Dist(i, i') \quad (1.10)$$

Therefore, the equating for the energy utilization of the head in equation (1.7) can be re-scripted as:

International Journal of Scientific Research & Engineering Trends
Volume 6, Issue 4, July-Aug-2020, ISSN (Online): 2395-566X

$$Energy_{head} = \alpha * energy|n_i| + \beta * energy_{traffic} + \gamma * energy_{transpower} \quad (1.11)$$

Wherever γ and α, β are denoting the deliberating component for the consequent network arguments. These values are set aside flexible so that they can be modifying as per the network situation.

VI. SELECTION OF NON-VOLUNTEER CLUSTER HEAD

"From the energy consumption model of the ad hoc nodes, it is understood that the cluster heads drain their battery power faster than the cluster members. Thus in order to have fair distribution of energy drainage among the nodes in the network, local selection for non-volunteer cluster heads takes place. When the current head (either the volunteer head or non-volunteer head) drains its battery power above a threshold value, it selects one of its own cluster members having the highest weight among others and sends an invitation for the role of cluster head. The selected node has the choice to accept or reject the invitation depending on its available resources.

After accepting the invitation of the current head, the selected node becomes the new cluster head for that cluster. The existing head hands off its members to the new head that lies within the range of the later. The hand off that takes place is soft hand off (i.e. the resources allocated to the members remain unaltered). The nodes that do not remain within the range of the new head, try to join any other cluster head within their proximity. If the node does not find any head to do so, then it declares itself as an isolated volunteer cluster head. Finally, the current head affiliates as a member to the newly selected non-volunteer cluster head. Here, the selection process takes place locally within a cluster reducing the computation and communication overhead that would have yield in the global cluster head selection procedure. The pseudo-code segment of the algorithm for finding the non-volunteer head may be written as":

```
begin
………..
Seti = present-head     //volunteer or non-volunteer
Set max-wt =maximum (WTv) where v€ clusteri
Set next-head = Vmax-wt
Head (i) = next-head
For(every number € cluster, other than the next-head)
{
   If dist(next-head, number) <= next-headrange then
{
   Head(member) = next-head        //hand off
else if
reaffiliate member to other head in the range //reaffilation
else
select member as volunteer head        //reelection
}
   }
…..
End
```

Non volunteer cluster head option process is revealed in the figure 1.4 .In the fig cluster head as denoted by the node 4 with other node 5,11,9 and 3 as cluster members of its. After that the cluster head 4 choose the non-volunteer bunch head as node number 3 has the maximum mass between extra group members .Now the node 11 and node 9 are inside the attain of the latest non-volunteer cluster head. So these two hub re-associate to head node 3. Let us in the range of head 12 node 5 is not consider even. Finally the earlier group head becomes a member to the new head 3.

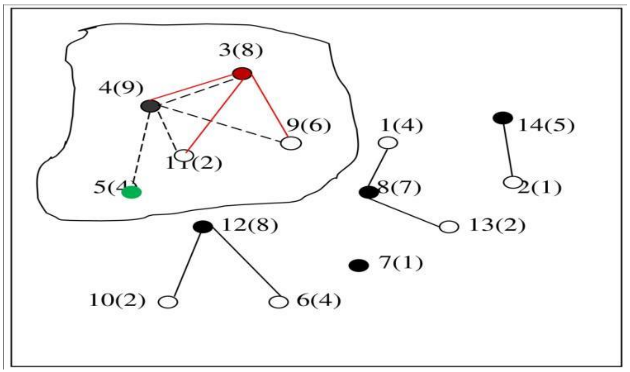

Figure 4. Selection of Non-Volunteer cluster head

VII. CLUSTER SUSTAINMENT

The procedure of grouping comprise of two levels i.e. Cluster establishment and cluster sustainment. The purpose of bunch level is to get smallest numeral of bunch heads by highest group constancy. Whereas the objective of group preservation is to protect as a lot of the accessible clustering structure as possible. As single mobile node moves away from the each other at that place happen link failures among them. If a bunch member have disconnect starting its group head. After that it explore in favor of other new head surrounded by the closely to find associated.

A like varying condition of an associate hub from its present head to other head is called re-association. Meant for all particular re-association of an element hub, together of its current and previous cluster head modernize their elements lists by removing or put the detail of this bunch part. This outcome in many communications to move among hubs and increase the congestion of the network as well as message complexity. Therefore, minimizing the occurrence of re-association turn into the goal of any clustering algorithm. After that the beginning bunch head selection for the projected algorithm a re-election of bunch head takes place when:

1. An individual hub goes thing or inaccessible by touching outside from extra nodes and itself called as volunteer group head:
2. An accessible group head utilize its battery control outside from entry value.
3. The hand-off group element taken from present head to the latest non-volunteer cluster head.

In the same way, re-affiliation of cluster members occurs when:

1 A element node go out the communication part of its current head and enter into another cluster part
2. A non-volunteer directs is selected so that the node of the accessible head re-affiliates to the new head or get other head in its range.

VIII. IMITATION OUTCOME AND CONVERSATION

The imitation of the projected TACA algorithm is passed out in 100 X 100 out net region. The movability mold in the circumstances is the random walk mobility mold. This active model presents the nearly all fickle and irregular motility of a hub [5, 6]. At this time a movable hub goes from its current position by selecting an arbitrary speed between (speedmin ,speedmax) and an arbitrary way between (0, 2π) correspondingly. In arbitrary stride mold while a mobile hub arrives at a replication border it bound back with a point of view resolute by the arriving path. This is a less-memory mobility model as it retains no information about its past direction and speed value [7]. For the imitation of TACA the velocity of devices is set aside among 0 mt/sec to 5 mt/sec. Through the hub mass computation the whole length covered by hub for n time's units are calculated to get the usual speed Sv. For the present imitation n is taken as 5. Likewise, the greatest allowable speed δ for the network is consider to 5.the message range is taken as 1024 bytes for the current work .Therefore the imitation arguments can be summarized as:
The battery control utilization by dynamic node for dissimilar functioning mode is measured as per the IEEE 802.11 LUCENT WAVELAN cards as:

Region (area)	100 X 100 meter
Mobility Model	Random Walk
Size of Packet	1024 bytes
Maximum Nodes	70
Transmission Range	5-40
$Speed_{min}$	0 m/sec
$Speed_{max}$	5 m/sec
δ	5
n	5

[2, 3]
Broadcastsend = 1.9µWs/byte *sizepacket + 250µ W.s (1.12)

Broadcastrecv = sizepacket * 0.5µW.s/byte + 56µW.s (1.13)
Idle= 808mW. (1.14)
Given below Figure 1.5 show the equivalence of outcome of TACA with that of WBCA and LID algorithm for the occurrence of hub re-association.
The fig refer to the outlines of the outcomes for all algorithm are nearly standardized. So as to the regularity of re-association grows with respect to the communication distance for a definite time. Consequently it this reduction by the enlarge in the broadcast series. Outcomes show the rate of re-association of hub for TACA is smaller than that of other. Since WBCA build upon on the signify linked of the node for load computation, the modify in the communication variety change the hub affinity according to the weights.

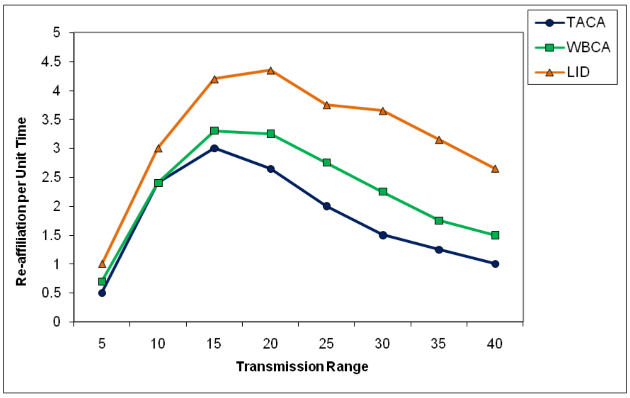

Figure 5 Equivalence for frequency of Re-association

The equivalence of outcomes of TACA with that of WBCA and LID in favor of the occurring of bunch head re-election shown in fig 1.6.Outcomes for both (WBCA and LID) algorithm have been discussed previously in chapter 2. At this point, it is clear that WBCA is similar to LID simply it remains greater than that the occurrence of re-election of cluster head for TACA.

This is shown in the figure total cluster head is greater than that of other algorithm. It is shown that the numbers of cluster heads are somewhat greater than that of the other algorithm. The motive is the creation of additional obscure group heads through the quiet obtainable elements of the accessible head to the latest non-volunteer group head in TACA. Even so, the main potency of TACA is its capability to add to the life time of the network. During the present effort the life time of network is distinct as the claps among the network beginning moment till the first hub enfeeble its power totally and get dead.

International Journal of Scientific Research & Engineering Trends
Volume 6, Issue 4, July-Aug-2020, ISSN (Online): 2395-566X

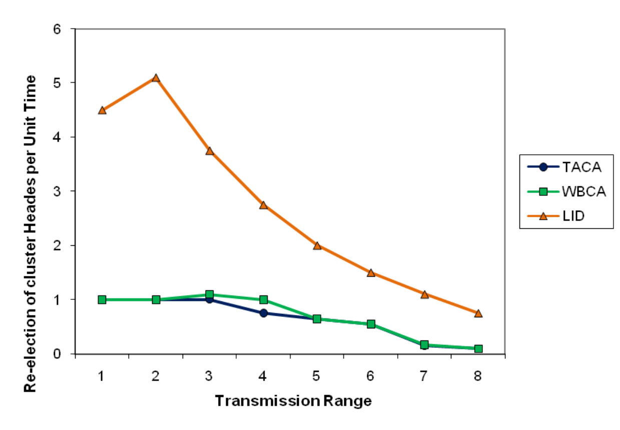

Figure 6. Frequency of cluster head re-election for equivalence

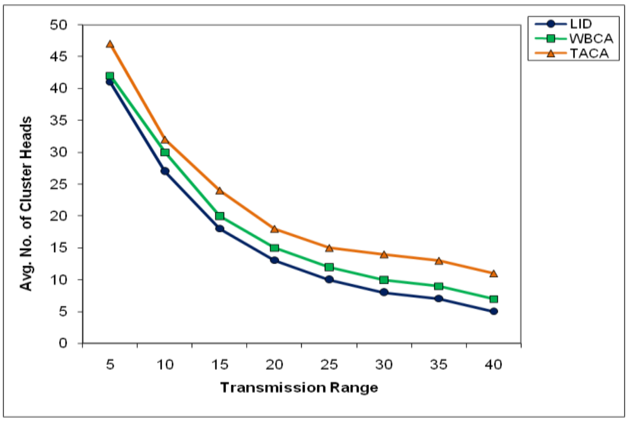

Figure 7. Average No. of Group Heads

In the above chart total network life time is directly related to present time.

In this result, if existing period is augmented the total network life time is augmented. Battery power of single node is logically scattered among the nodes. Due to this, no one node is overcharged though it performs as the group head. The group head either as volunteer or non-volunteer proceeds by the bulk of the nodes.

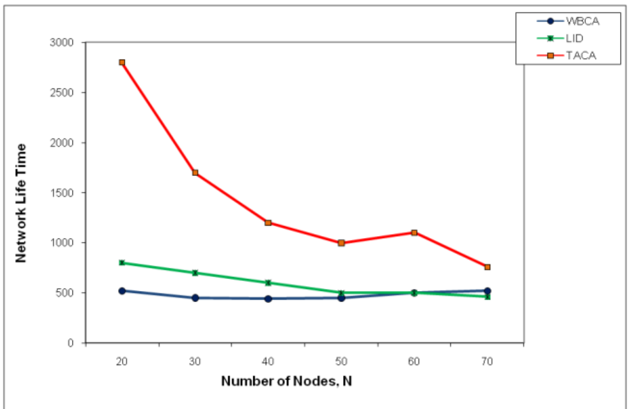

Figure 8. –Network life time

IX. CPN tool Proof the TACA

CPN tool has been prepared as option procedure for giving the justification for cluster head. The whole framework of TACA algorithm for group choice among the one-hop neighbors is given in the fig 9.In the upper region of framework the leftover is unchanged as that of NDP and in the lower region of the framework two replacement transitions select head and sendCACK are added. There are two replacement transitions revealed in both figure 9 and 10 which are connected to their several subpages .The elaborate explanation of replacement transitions is as follows.

Select head: The purpose of this transition is to select the cluster head by choosing the node having maximum weight among its one-hop neighbors. This transition has two input places Nlist and volunteerhead and two outputs non-head and volunteerhead. In the subpage of the substitution transition as shown in the figure 10, the input place Nlist provides the list of neighbors of a node. So this place is assigned with an in-port in the subpage. The place volunteerhead is initialised with a node selected as the cluster head. It has both input as well as output arc to the transition. The input arc carries the data from the place and compares the weight of this assumed cluster head to that of the node received from the Nlist place. If the weight of the neighbor node is higher than the currently assumed head, then the data is updated as indicated by the arc inscription from the transition to the place volunteerhead.

The place volunteerhead is assigned with the I/O port as it has both input arc and output arc to the transition. The node having the lower weight than the other go to the non-head place as indicated by the arc inscription from transition to this non-head place. This place is assigned with the out-port in the subpage. Thus with the occurrence of the transition, place volunteerhead stores the details of the cluster head and the place non-head stores the details of the ordinary nodes. The tokens stored in both the places makes an enabled state for the transition send to Msgstore in the main page of the model. The output arc inscription of the transition send to Msgstore indicates the frame of the token to be passed to the place MSGSTORE. It can be seen that, the #ty field of the message has been set to 1. This implies that the cluster head has been selected. This message is now stored in the common place MSGSTORE.The occurrence of transition ReceiveMsg and the subsequent occurrence of transition ClstMsg adds a token having the #re = AH(1) and #ty = 1 in the place ClstMsg as indicated by the occurrence conditions of the respective transitions. Thus, now the place ClstMsg contains a message from the cluster head.

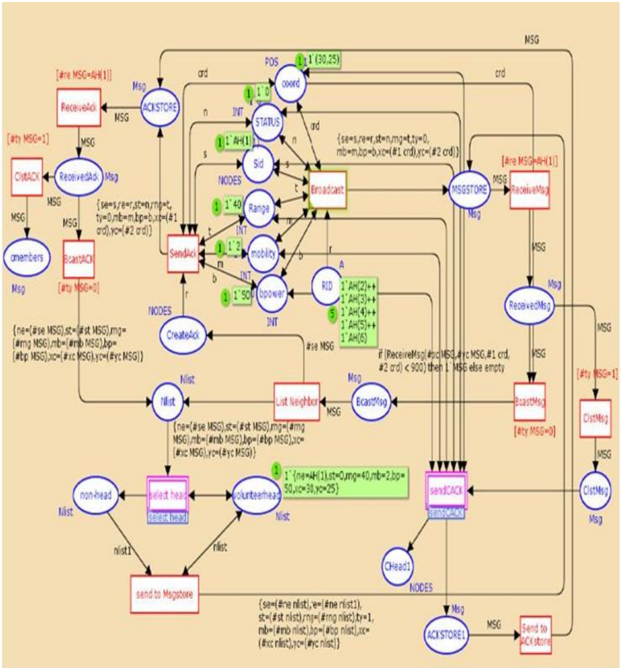

Figure 9. Model for validation of TACA

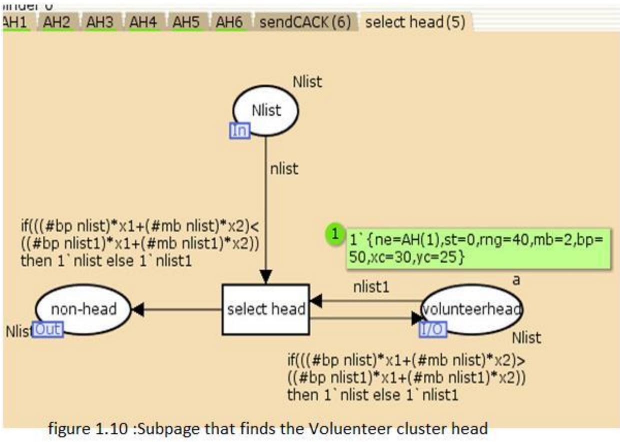

Figure 10. Subpage that finds the voluenteer cluster head

X. CONCLUSIONS

The proposed algorithm in this paper is TACA. This algorithm dispersed in characters that choose a group head from confined topology. That is to say that its one-hop neighbors are elected as the group head which surrounds the node that has the maximum weight. The accessibility of battery ability and standard motility measures the heaviness of the hub. Due to this less movable hub with extra accessible battery power to get the possibility to turn into a group head consequently in battery group solidity. More, to decrease the weight of group head on a single node, non-volunteer group heads are elected locally with the accessible head in order to save the node battery power in some exsert. It has been investigated in the outcomes that, through the head off process of cluster members, a part cluster heads are generated growing the number of elements in virtual backbone. Though, the network life time increased to substantial worth in association with accessible algorithm which is the major purpose of existing cluster algorithm. This algorithm has been generated isolated cluster heads may be decrease by provide heads to associate to any close group head. This may be possible by innovation of any topology control algorithm. To conclude, CPN tool has been validated the TACA option process in the form of cluster head, to make sure that the movement of the data and manage between the node are in correct direction and fulfill the in demand goal of the structure.

REFERENCES

[1] Rajan, M. A. et al (2008). Concepts of graph theory relevant to ad-hoc networks. International Journal of Computers, Communications & Control, 3(3), 465-469.[45]

[2] Feeney, L. M. and Nilsson, M. (2001). Investigating the energy consumption of a wireless network interface in an ad hoc networking environment. In INFOCOM 2001. Twentieth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings. IEEE (Vol. 3, pp. 1548-1557). IEEE.[46]

[3] Feeney, L. M. (2001). An energy consumption model for performance analysis of routing protocols for mobile ad hoc networks. Mobile Networks and applications, 6(3), 239-249.[47]

[4] Gao, Q. et al (2006). Radio range adjustment for energy efficient wireless sensor networks. Ad hoc networks, 4(1), 75-82.[48]

[5] Lin, G. et al (2004, March). Mobility models for ad hoc network simulation. In INFOCOM 2004. Twenty-third Annual Joint Conference of the IEEE Computer and Communications Societies (Vol. 1). IEEE.[49]

[6] Zonoozi, M. M. and Dassanayake, P. (1997). User mobility modeling and characterization of mobility patterns. IEEE Journal on selected areas in communications, 15(7), 1239-1252.[50]

[7] Baker, D. and Ephremides, A. (1981). The architectural organization of a mobile radio network via a distributed algorithm. IEEE Transactions on communications, 29(11), 1694-1701.[51]

[8] Santi, P. (2005). Topology control in wireless ad hoc and sensor networks. ACM computing surveys (CSUR), 37(2), 164-194.[90]

[9] Yang, Zang et al (2007).A Weighted-based clustering algorithm for mobile ad hoc networks. In Proceddings of 3rd International Conference on wireless and mobile communication (ICWMC'07),page 3,Guadeloupe.

[10] Baker, D. and Ephremides, A. (1981). The architectural organization of a mobile radio network via a distributed algorithm. IEEE Transactions on communications, 29(11), 1694-1701.