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Highlights

Reputation based Resource

Interoperability in Heterogeneous

Detection and Counter Measure

Efficient Ant Colony Optimization

Discovering Thoughts, Inventing Future

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QFSRD: Orthogenesis Evolution based Genetic Algorithm for Qos Fitness Scope aware Route Discovery in Ad Hoc Networks

By M. L. Ravi Chandra & Dr. P. Chandra Sekhar Reddy
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Abstract- Here in this paper we devised a novel orthogenesis evolution based GA technique for QoS fitness scope aware routing in Mobile Ad hoc Networks. The past decade research towards route discovery strategies for mobile ad hoc networks is continuing with magnitude speed. However, the majority of the routing solutions devised in past are dealing only with the optimality of the data transmission. QoS aware hop level connections in a given route are not supported with the desired frequency. Hence the QoS aware routing in mobile ad hoc networks is grabbing the attention of many researchers as this domain is on the hot edge of the current research. In regard to this we devised an Orthogenesis evolution based Genetic algorithm for QoS fitness scope aware route discovery in Mobile ad hoc networks. Due to the computational complexities of GA and limits of ad hoc network resources, very few researchers devised GA based QoS optimality strategies for route discovery in MANETs. The model devised here in this paper is successfully handling these issues and emerged as best in its class of QoS aware route discovery strategies. The experimental results are exploring the scalability, optimality and robustness of the proposed model.

Keywords: *othogenesis evolution, QOS fitness scope.*

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M. L. Ravi Chandra [α] & Dr. P. Chandra Sekhar Reddy [σ]

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I. Introduction

MANETs are wireless mobile Ad Hoc Networks that operate without any infrastructure, can be implemented quickly and are flexible to the connectivity and environment of the traffic and mobility patterns.

MANET is unlike a traditional wireless networks that have a wired network supporting them for providing data services to mobile users. The network can be setup anywhere for sharing data where there is no pre existing wired network. The applications of mobile Adhoc network vary such as, setting up a communications network in a local area for conferences, meetings, advertising, e-classes, media events, for communications used in battlefields, for telecommunication networks in traffic control [15], for communication in disaster recovery areas, etc.

In MANET the network communication is a peer-to-peer wireless connectivity between nodes with either a single hop between a mobile cell and a base station or multi-hop wireless transmission without any base stations.

The nodes are mobile and act as hosts as well as routers. A node functions, as a host transmitting data to other nodes, as a destination node for receiving the data and also as a router for routing the data to other nodes.

The study in the field of routing in Mobile Ad hoc Networks has been extensive however is mostly based on the best effort data traffic [1, 2] that is not actually a Quality of Service. Similar studies based on QoS objective in wire line network routing [3, 4] devised algorithms for routing that face in MANETs implementation problems due to the networks dynamic topology and bandwidth constraints.

The increasing availability and use of mobile devices and requirement for wireless access of Internet, television, VOIP, multimedia audio/video, and especially real time audio and video streaming requires these services to be implemented in MANETs with Quality of Service (QoS) routing. The need for implementing MANETs is increasing parallel to the growth in access of mobile data.

The service quality is defined by efficiency of the data flow which can be measured with a set of constraints such as bandwidth, response time of service, end-to-end delay, interruptions, packet loss, etc.

In path discovery the algorithms for routing try to find a path having suitable QoS specified resources while minimizing the search, distance and traffic problems. A Mobile Adhoc network is depicted in the below Figure 1. A topology of a wireless paths is obtained from the Figure 1 and is depicted in the below Figure 2. The nodes that are mobile in nature are represented by A, B, C, K letters and the bandwidth available with the wireless links is represented adjacent to every edge with 1,2,3,4,5,6 numbers. If we require determining a path between source node A and destination node G, the path that is shortest according to a general technique of path finding would be "A-B-H-G". The selection of the QoS route is completely different from the general practice as criterions such as bandwidth etc are considered as QoS metric. If a path between node A and node G is required with minimum of 4 mbps bandwidth then path that is shortest "A-B-H-

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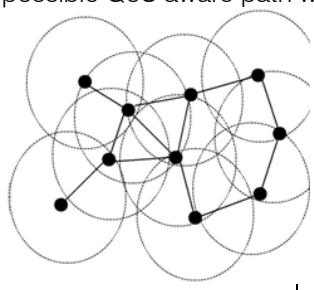
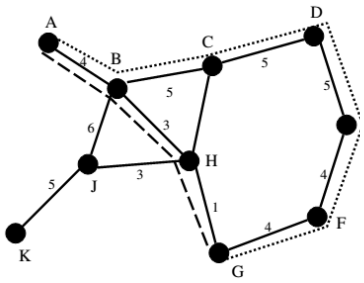
G" cannot offer the needed bandwidth and so the possible QoS aware path would be "A-B-C-D-E-F-G."



Mobile Node
Signal Range
Wireless Link

Figure 1 : An example Manet connectivity



Shortest Path
QoS satisfied path

Figure 2 : an example of QoS routing in Manet

The research work developed till date for QoS based routing of Mobile Adhoc Networks are, QoS models [5, 6], QoS resource reservation signaling [7], QoS Medium Access Control (MAC) [8], QoS scheduling [9], and QoS routing [10, 11, 12, 13, 14].

The complex QoS functionality involved in MANET implementation is limited by available resources and dynamic network topology. The flow could be inelastic i.e. uni or multicast, elastic involving TCP or the QoS may have multiple client requirements making the QoS routing very difficult [12, 14] as determined in previous research. In a dynamic environment as the nodes are mobile the addition and deletion of nodes makes the creation of routing paths very complicated. To handle the sudden changes affecting the MANET topology and delivering a multi-path QoS routing requires designing approximated solutions and efficient routing algorithms with various techniques and the latest techniques such as Fuzzy Logic (FL), Artificial Intelligence (AI), Neural Networks (NNs), Genetic Algorithm (GAs) etc.

In this paper an orthogenesis GA based QoS fitness scope aware route selection strategy for MANETs called QFSDR is presented. This technique is devised with the motivation gained from the earlier model called GA based routing method GAMAN [18]. The objective of the proposed model is, unlike GAMAN and other benchmarking models it should consider many QOS factors along with other contextual QoS metrics and also should achieve the optimality in evolution complexity. The performance of the method is assessed with simulations based tests in different network topologies.

The paper is structured as below. Section 2 shows the confirmed contemporary related work. The devised model is explored in Section 3. The results of the simulation tests are shown in the Section 4. The conclusions are finally presented in Section 5.

II. Related Work

In this section a review of the routing techniques based on QoS in MANETs are given as follows,

A QoS-aware routing path discovery approach called "ticket-based probing algorithm" by Nahrstedt et al [10] is based on controlling with a calculated number of tickets the total messages flooded in a route. A message for probing comprises of minimum one ticket and a message on arrival at a node if it does not contain only one ticket may be divided into several probes and routed to other nodes. In this way every child probe consists of tickets subset to its parent. The probe carrying the hop-by-hop path or the delay/bandwidth data is used in reserving the resources based on the QoS requirements. The developers of the ticket based algorithm have built the technique on an imprecise model. Unlike wire line networks, Mobile Adhoc networks are constantly affected by link breakages resulting in the information transmitted being of imprecise type. So for the ticket-based probing algorithm is based on a plain model of imprecise nature where the history and current (estimated) delay variations are computed to determine the current delay depicted in a range [delay – δ, delay + δ]. This algorithm applies route redundancy at various levels by including in route maintenance the techniques of path-repairing as well as re-routing. Here in the process, a node on detecting a path that is broken notifies the source node. The source node then uses the technique of path-repair for repairing the old path using local reconstructions. The transmission is rerouted with a new possible route while notifying the subsequent release of resources at the nodes existing between in the old route. Here unlike the technique of re-routing, a completely new path is not found and instead the approach attempts to adjust to the MANETs dynamic environment.

A routing approach based on QoS for Mobile Ad hoc networks of size in the range of small and medium called "Core Extraction Distributed Ad hoc Routing (CEDAR)" [11]. The CEDAR approach involves 3 main mechanisms. First, the Core Extraction mechanism selects a group of nodes based on the MANETs minimum dominating group or links having large bandwidth of stable nature, to create the core that manages the nodes local topology and computes the route based on the requirement and the state of local conditions. Next Link State Propagation mechanism distributes to all the core nodes the information of the bandwidth available with stable links. The routing based on QoS is attained by passing stable links related high-bandwidth information to distant nodes in the network and by containing dynamic links low bandwidth information in the area locally. Finally in the Route Computation mechanism, the computation of the path

establishes a core route from the source node domain to the destination node domain. This data of the core path is used to determine iteratively a partial route in the path that forms the core from the source to the farthest domain node possible in terms of the demanded bandwidth. In the next iteration this node acts as the source node.

In the strategy of CEDAR, the core mechanism offers a capable and cost effective platform for routing and the state propagation guarantees link-state information accessibility to core nodes with minimal expenses.

A protocol for routing given in [14] is built on QoS criteria and based on the estimation of the bandwidth. This bandwidth assessment is done by disseminating with "Hello" messages the information of the bandwidth. A contrast of two dissimilar approaches of bandwidth estimation is given here. When the criterion of bandwidth release is primarily essential, the functionality of the estimation method based on "Hello" bandwidth is efficient in comparison to the assessment approach based on "Listen" bandwidth. When the criterion of topologies of static nature using huge weight factors to minimize the congestion as well as the incorrect signaling of broken routes by lost "Hello" messages is considered the methods "Hello" and "Listen" show good functionality that is mostly same. When the criterion of mobile topology is considered "Hello" strategies functionality is more effective with respect to end-to-end throughput whereas the "Listen" strategies functionality is good with respect to the packet delivery ratio.

Genetic Algorithm-Based QoS Routing Protocol for MANETS (GAMAN) [18] for ad hoc networks is the most recent and best of its kind. The GAMAN is devised to identify optimal routes that are specific to two QoS factors called end-to-end delay and max transmission success ratio. The GAMAN is aimed to define QoS aware optimal routes for mobile ad hoc networks (MANTETs). Under the impact of mobility, the Quality of Service is proportionate to the node connectivity. The GAMAN is based on single point crossover and mutation and fitness function is assessing only the end-to-end delay and max transmission success ratio. The GAMAN evolutions are elitist that maintains best fit route remains unchanged in further evolutions. The experimental results explored by the authors concluding that it is optimal and robust for sparse to lower range of dense size networks. Moreover the fitness assessment is specific to a particular QoS factor; hence the route discovery is not optimal in regard to other QoS factors. The elitist model is optimal, but evolutions count is not in control for networks with nodes having QoS metric values distribution with high skewness [20].

Leonard Barolli, Makoto Ikeda et al., [19] devised a novel local search optimization strategy, which is an extension to their earlier work GAMAN [18] that referred as E-GAMAN. The devised search space reduction algorithm (SSRA) is mainly aimed to minimize the crossover complexity observed in GAMAN. So that the local search become much faster, hence the time taken for optimal route selection will be low and the GAMAN can find a feasible wireless path very fast. But the issue of considering the impact of QoS factors other than mobility remains same and the evolutions count is still not in control for networks with nodes having QoS metric values distribution with high skewness [20].

In a gist, almost all of these benchmarking models including GAMAN [18] are specific to one or two QOS factors. The GAMAN is also not confident when QoS metric values are distributed with high skewness [20]. Henceforth, here in this paper we devised a novel orthogenesis genetic algorithm for optimal QoS aware route selection for mobile ad hoc networks. Unlike GAMAN the said model is equally considering all QoS metric values to assess the fitness of the resultant route. Since the GA that considered is following orthogenesis approach and the statistical strategy used to fix the need and scope of further evolutions, the number of evolutions is in control, which leads to minimize the search space

III. Orthogenesis Evolution based Genetic Algorithm for QoS Fitness Scope aware Route Discovery

Unlike the traditional GA, the proposed model is constructing new generations by progressive evolution strategy. The progressive evolution strategy generates the child elements having more fitness than one or both of the parent elements. Hence the number of evolutions can be limited. The other contribution in devised model is fitness assessment that considers the many metrics with equal priority and the same time not losing the influence of prime QoS metric such as energy efficiency, connectivity or bandwidth availability. The QoS fitness scope assessment strategy proposed in this paper is based on the QoS factors of route and their earlier allocation impacts, which are described below:

- A route can be rated best under a specific QoS factor, but might fail to deliver the same performance under the consideration of multiple QoS factors.
- A route can be rated divergently with respect to its various QoS factors. As an example, a route can be best with respect to bandwidth availability, but the same route might be moderate in terms of packet delivery ratio scope, worst in the context of end-to-end delay scope.
- The importance of the QoS factors might vary from one routing context to other.
- According to the impact of QoS factors of the routes described, it is evident that the best ranked route under single QoS factor is not always the optimal

towards ad hoc routing. The route that performed well under some prioritized QoS factors are always need not be the best fit under other prioritized QoS factors. In regard to this the devised QoS fitness scope aware strategy finds the best fit route, which is based on QoS fitness scope and one or more prioritized QoS factors opted. This process is labeled as QoS fitness scope evaluation. Further routes are ranked according to their QoS fitness scope and will be used in the same order to finalize a route towards selection and scheduling. The algorithmic exploration of the model proposed is follows:

- ✓ Input: All possible routes as routes set R
- ✓ Fitness factors:
  - o connectivity (+), bandwidth (+), end-to-end delay (-), reputation (+) , energy usage(-) and other metrics if any
- ✓ QoS Fitness Scope (qfs) calculation:
  - o The QoS factors that are optimal with high values are considered as positive factors
  - o The QoS factors that are optimal with low values are considered as negative factors.
  - o Initially normalize the QoS factors values such that all are optimal with high values...
  - o To do that normalization of a negative factor will be $\frac{1}{mv}$, here mv is metric value
  - o normalization of positive factor will be $1-\frac{1}{mv}$
  - o Choose any of the QoS factor as prime factor, which is according to routing context
  - o Extract all node to node connections as edges available for each input route.
  - o Find QoS metric values of all these edges
  - o Find QoS metric values of route, which are the mean of QoS metric values of all edges found in that route
  - o Prune routes that are not justifying the prime QoS metric
  - o Rank the rest available routes for each QoS factor (highest normal form of the QoS factor value will be ranked best in order)
  - o Find variance between ranks of QoS factors for each connection (This indicates the discrepancy of the ranks), the distance of this variance value from 1 gives the nearness of these ranks, which we refer as QoS fitness scope (qfs).
- ✓ Orthogenesis Evolution
  - o Find crossover points of each pair of routes, which are common nodes in both routes
  - o For each crossover point
    - ▪ Intersect these pair of routes at crossover point and form new route such that left part of the first route connected to right part of the second route through the crossover point, and also form another route such that connect the right part of the first route to left part of the second using crossover point.
    - ▪ Find qfs of these two new routes and verify that the qfs of the new route is greater than the qfs of any of the parent, if so accept that, if not discard that route.
  - o New routes if any, add to routes set R
  - o Prune the unqualified routes from ' R ', which is based on the prime QoS factor.
  - o Continue the above Orthogenesis evolution process for max evolution threshold given.
  - o Verify the kurtosis of the qfs distribution among the resultant routes, if kurtosis is leptokurtic, and then continue Orthogenesis evolution for next max evolution count given. If kurtosis is mesokurtic or platykurtic then stop evolutions and select n number of routes from the resultant routes set R

The QoS metrics of each edge between hop level nodes of route are considered to assess the best fit route and these metric are categorized as positive and negative, which is based on their value. The metrics with desired value as high referred as positive metrics and the metrics with desired value low are referred as negative metrics. The scope of the described metrics is assessed against the transmission of n packets. These metrics are described below.

- ➢ Connectivity (+) = Due to the factor of mobility, the connectivity between the nodes is a sensitive metric towards QoS aware Routing. This is appositive metric, since connectivity with high value is desirable. This metric can be assessed as follows

$$cs(e_i) = pct(e_i) - rct_n(e_i)$$

Here in the above equation $pct(e_i)$ is representing the possible lifetime (this decides by the nodes mobility direction and speed) of edge e_i and $rct_n(e_i)$ representing the required connected time for n packets transmission.

- ➢ Bandwidth compatibility (+ve metric): This factor is also one of the prime QoS factors, since the sufficient bandwidth is essential to perform routing with minimum guarantee. It comes under either positive. The bandwidth available at a route must be greater than the required bandwidth of the current transmission requirements. The measuring of bandwidth compatibility is as follows:

$$bc(e_i) = ba(e_i) - br(e_i) \quad \ldots\ldots (8)$$

- Here in the above equation $bc(e_i)$ is indicating the bandwidth capacity of edge e_i, $ba(e_i)$ is indicating the bandwidth available at edge e_i and the '$br(e_i)$' is the bandwidth required at e_i

➢ End-to-End delay (-) = The elapsed time of the n packet transmission, which indicates the positive difference between time taken to transmit n packets and actual time expected to transmit. This can be measured as follows:

$$eed(e_i) = ttt(e_i) - ett(e_i)$$

- Here in above equation $eed(e_i)$ represents the end to end delay observed for n packet transmissions on edge e_i, $ttt(e_i)$ indicates the time taken to transmit and $ett(e_i)$ represents the expected time to transmit.

➢ energy usage(-) : The nodes in ad hoc network are self energized, hence the minimal usage of energy towards routing is precious, which leads the nodes to survive maximum life time that helps to maximize the network life time. The energy usage is negative factor since the minimal values are desirable. This can be measured as follows:

➢ $eu(e_i) = fr_n(e_i) * er_{hz}(e_i)$

- Here in above equation $eu(e_i)$ energy used at e_i, $fr(e_i)$ represents the frequency required in HZ for n packets and $er_{hz}(e_i)$ represents energy required in jouls per hz

The QoS fitness of a given route is assessed under the context of multiple QoS factors and then ranked them based on the selective prime QOS factor. This strategy explored in following section

a) Assessing QoS fitness scope

Let R be the set of routes such that $R = \{r_1, r_2, r_3, ...r_n\}$, found in route request process. The set of nodes N such that $N = \{n_1, n_2, n_3, ..., n_c\}$, are the nodes available in the scope of target ad hoc network. Each route $\{r_i \forall r_i \in R\}$ can be defined as set of nodes such that $\{r_i \forall r_i \in R\} = \{n_s, n_{h1}, n_{h2}, n_{h3}, ..., n_{hj}, n_{hj+1}, ..., n_d \forall n_{hj} \in N\}$. Here $\{n_{hj} \forall j : 1...m \wedge n_{hj} \in N\}$ is the node involved to form the route r_i between source node n_s and destination node n_d.

Let connectivity scope, bandwidth capacity, end to end delay, energy usage, and other such metrics as a set of QoS metrics $M = \{[cs(e_i), bc(e_i), eed(e_i), eu(e_i).....]\forall i = 1...x\}$ of available set of Routes R between source node n_s and destination node n_d.

The QoS factor $eu(e_i)$ is taken as prime metric (any QoS metric can be selected as prime metric, which based on the routing context), which is using to order the routes. These QoS metrics of the routes are categorized as positive and negative metrics. If the incremental values of the metrics are optimal then those metrics are referred as positive metrics and if decrement values are optimal then those metrics are negative metrics.

Henceforth the values of negative and positive metrics should be normalized, which is as follows:

For each route $[r \exists r \in R]$ begin

For each QoS metric $\{m_k(r) \forall m_k \in M \wedge r \in R\}$ of route r Begin

$$m_k(r) = 0$$

End

For each edge $\{e_i \forall e_i \in r\}$ Begin

For each metric $[m_k(e_i) \forall m_k(e_i) \in M]$ edge e_i Begin

// here M represents values of selected edge of route r

If $m_k(e_i)$ is value of +ve metric then $m_k(e_i) = 1 - \frac{1}{m_k(e_i)}$

Else If $m_k(e_i)$ is value of -ve metric then $m_k(e_i) = \frac{1}{m_k(e_i)}$

$$m_k(r) = m_k(r) + m_k(e_i)$$

End

End

For each QoS metric $\{m_k(r) \forall m_k \in M \wedge r \in R\}$ of route r Begin

$$m_k(r) = \frac{m_k(r)}{|r| - 1}$$

// each QoS metric value of each route , //which is an average of that QoS metric //value observed at all edges in that route

End

Then the available routes R are ranked by their normalized metric scores $\{m_k(r) \forall m_k \in M \wedge r \in R\}$ from maximum to minimum, such that each route r gets different rank for different metric $m_k(r)$.

Further these ranks will be used as input to measure the QoS fitness scope qfs.

Let Rank set of a route $[r_i \exists r_i \in R]$ is $O(r_i) = \{om_1(r_i), om_2(r_i), om_3(r_i), ..., om_{|M|}(r_i)\}$ (here $|M|$ indicates the total number of metrics) and then QoS

fitness scope (qfs) of each route can be measured as follows.

$$\mu_{O(r_i)} = \frac{\sum_{k=1}^{|O(r_i)|} [om_k(r_i) \forall om_k(r_i) \in O(r_i)]}{|O(r_i)|}$$

// the above equation represents the average of the ranks obtained for different metrics of route r_i

$$qfs(r_i) = 1 - \left[\frac{\sqrt{\left(\sum_{k=1}^{|O(r_i)|} (\mu_{O(r_i)} - [m_k(r_i) \forall m_k(r_i) \in O(r_i)]) \right)^2}}{|O(r_i)|} \right]^{-1}$$

The above equation is derived from the process of calculating variance between given number of attribute values. Subtracting variance observed, from 1 gives fitness scope. Here in above equation, $\mu_{O(r_i)}$ represents the mean of the all ranks of different QoS metrics of the route r_i .

Then these routes will be ordered based on the prime QoS metric. Among the ordered routes, the best routes in regard to prime QoS factor will be selected, and then they will be ordered from maximum to minimum of their qfs value.

a) Exploration of Orthogenesis Genetic Evolution for QoS Fitness Scope Aware Route Selection

The devised orthogenesis GA performs progressive evolution process. In the context of optimal QoS aware route discovery, these progressive evolutions will be applied on set possible routes R found between source and destination nodes. The number of evolutions is initially limited to max evolution count given, further, the kurtosis [20] of the qfs distribution across the routes in resultant R is assessed. (i) If the kurtosis of the qfs distribution is mesokurtic (kurtosis is equal to 3), which indicates that the variation of qfs distribution is reflecting moderate then the further evolutions continues by adjusting the max evolution count to half of its current value . (ii) If distribution is reflecting leptokurtic, which indicates the variation of the qfs distribution is high then the further evolutions continues for max evolution count number of times. If distribution is platykurtic, which indicates that the qfs distribution is with negligible variation, hence stop further evolutions.

The evolution approach

$ord \leftarrow false$ //route discovery process completion state
$optr \leftarrow \phi$ //optimal route set; $ec = 0$
$ect = 0$ //represents maximum evolutions threshold
While ($!ord$) Begin
  $nR \leftarrow \phi$
  For each route r_i find crossover points Begin
    For each route $\{r_j \exists (r_j \in R \wedge j \neq i\}$ Begin
      $nR \leftarrow$ Orthogenesis _ Evolution (r_i , r_j) //progressive evolution, leading to the development of a improved form, as can be seen through successive generations
    End
  End
  $R \leftarrow nR$ //adding new routes to R
  $ec \leftarrow ec + 1$
  If($ec \geq ect$)Begin
    R = pruneR(R)
    ks = find_kurtosis_of_qfs_distribution(R)//is finding the kurtosis state of the fitness distribution across the evolutions
    If ($ks = 3 \&\& ect > 1$) Begin //mesokurtic 
      $ect = \frac{ect}{2}$
      $ec = 0$
  //continues evolutions for further ect times

End

Else if ($ks > 3$) Begin//leptokurtic 

$ec = 0$

End

Else if($ks \leq 3$) Begin //platykurtic 

$ord \leftarrow$ true

End

End

End

Orthogenesis_evolution(r_i, r_j) BEGIN

$r_{ij} \leftarrow \phi$ //is a set routes formed from crossover of r_i, r_j

For each node $\{n_{hk} \forall n_{hk} \in r_i\}$ Begin

$cop \leftarrow \phi$

For each node $\{n_{hl} \forall n_{hl} \in r_i\}$ Begin

If ($n_{hk} \cong n_{hl}$) Begin

$cop \leftarrow n_{hk}$

End

End

For each $\{cp \forall cp \in cop\}$ Begin

$\overline{qfs} = 0$

$\bar{r} = \phi$

Intersect r_i at cross point cp and form $\overleftarrow{r_i}$ and $\overrightarrow{r_i}$

// $\overleftarrow{r_i}$ is left part of cross point cp in route r_i ,

// $\overrightarrow{r_i}$ is right part of cross point cp in route r_i

Intersect r_j at cross point cp and form $\overleftarrow{r_j}$ and $\overrightarrow{r_j}$

// $\overleftarrow{r_j}$ is left part of cross point cp in route r_j ,

// $\overrightarrow{r_j}$ is right part of cross point cp in route r_j

Form route r_k as

$r_k \leftarrow \phi$

$r_k \leftarrow \overleftarrow{r_i}$

$r_k \leftarrow cp$

$r_k \leftarrow \overrightarrow{r_j}$

//forming route by connecting left part of r_i and right part of r_j

If $(qfs(r_k) > \overline{qfs}$ Begin

$\overline{qfs} = qfs(r_k)$

$r_z = r_k$

End

Form route r_k as

$r_k \leftarrow \phi$

$r_k \leftarrow \overleftarrow{r_j}$

$r_k \leftarrow cp$

$\rightarrow$

//forming route by connecting left part of r_j and right part of r_i

$r_k \leftarrow r_i$

if $(qfs(r_k) > \overline{qfs}$ Begin

$\overline{qfs} = qfs(r_k)$

$r_z = r_k$

End

$r_{ij} \leftarrow r_z$

End

For each new route $\{r \forall r \in r\}$ Begin

If ($qfs(r) < qfs(r_i) \& qfs(r) < qfs(r_j)$) Then delete r from r_{ij}

End

End

END

Kurtosis_of_qfs_distribution(R) BEGIN

Find mean of the qfs of all routes

$$\mu(QFS) = \frac{\sum_{i=1}^{|R|} qfs(r_i)}{|R|}$$

Here in the above equation $\mu(QFS)$ is the mean of qfs distribution over all routes in R

Find standard deviation (square root of variance

$$\sigma_{QFS} = \sqrt{\frac{\sum_{i=1}^{|R|} (qfs(r_i) - \mu(QFS))^2}{|R|}}$$

Here in the above equation σ_{QFS} standard deviation of qfs distribution across the routes in R

Find kurtosis of the qfs distribution across the routes in R

In regard to this, first find the 4th moment of the qfs distribution

$$m4 = \frac{\sum_{i=1}^{|R|} (qfs(r_i) - \mu(QFS))^4}{|R|}$$

Here in the above equation $m4$ represent the fourth moment of the qfs distribution

$$g(R) = \frac{m4}{\sigma_{QFS}}$$

Here in the above equation $g(R)$ is representing the kurtosis of the qfs distribution across the routes in R

Return $g(R)$

END

IV. Empirical Analysis and Results Exploration

The empirical analysis was done by a simulated mobile ad hoc network environment, which is build by using NS2 to visualize and TCL to control The network environment build on the simulation is considering the randomized node placement with random waypoint mobility. The opted QoS metric values observed at hop level edges on an event of time was randomly distributed under the context of poison distribution. The simulation environment was bounded to the parameters

explored in table1. The simulation was opted to AODV strategy to discover the possible routes between given source and destination nodes. Further to obtain the QoS fitness scope aware routes from the discovered routes was done by using the expression language called R. The experiments were done on simulated network environment with divergent count of nodes range from 50 (sparse) to 250 (dense). In other dimension the experiments were done under nodes with divergent mobility speeds.

Table 1 : Network constraints for simulation environment

The range of Nodes	50 to 250
The range of mobility speed	0.5m to 3m/sec
Communication Strategy	MAC 802.11 DCF
Network Occupancy	1000 X 1500 m2
Node transmission frequency scope	100 meter
Packet type	CBR & FTP
Node Mobility Strategy	Random way point
Simulation Time	100, 300 Sec

The results observed from experiments indicating that the proposed Orthogenesis GA for QoS fitness scope aware route discovery (QFSRD) is scalable and robust that compared to GAMAN [18] and E-GAMAN [19]. The completion evolution completion time is considerably low and scalable (see figure 3), the evolution complexity observed at proposed QFSRD scalable and stable (see figure 4). The skewness observed for QoS fitness distribution over top n (here in experiments $n = 10$) resultant routes from the QFSRD is low and optimal (see figure 5).

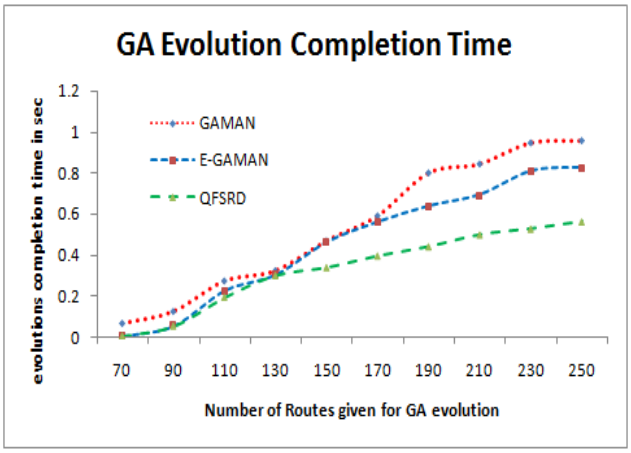


Figure 4 : The completion time observed for evolutions under GAMAN,E_GAMAN and QFSRD

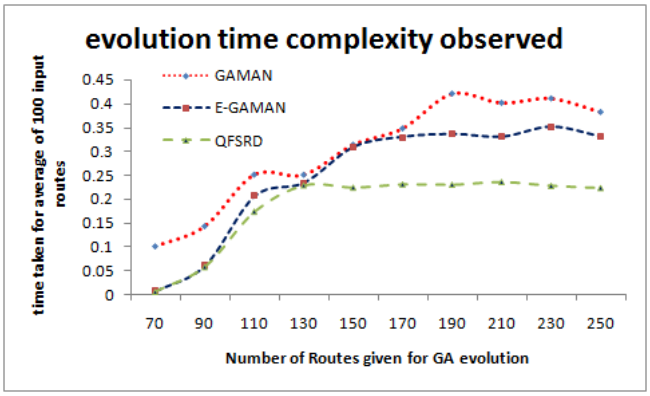


Figure 5 : The computational complexity observed for evolutions under GAMAN, E-GAMAN and QFSRD

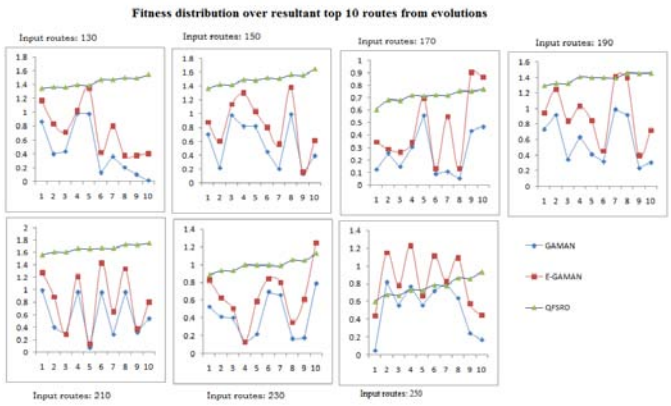


Figure 5 : Fitness distribution over best n resultant routes from GAMAN, E-GAMAN and QFSRD

V. Conclusion

Orthogenesis based Genetic algorithm has been devised here in this paper, which is in the context of QoS fitness scope aware route discovery for mobile ad hoc networks. The limits observed in earlier GA based QoS aware routing discovery strategies called GAMAN [18] and E-GAMAN [19], motivated us to devise this Orthogenesis based Genetic Algorithm for QoS fitness scope aware route discovery. Unlike these two models[18][19], the devise model is assessing the fitness of the route by considering all QoS factors along with prime QoS metrics such as connectivity, bandwidth. The progressive evolution strategy of orthogenesis approach is another key contribution of the proposed model. This progressive evolution minimizes the number of evolutions compared to the traditional GA with elitist (best fit remain unchanged) strategy. The major contribution this paper is the QoS fitness scope assessment strategy, unlike any existing benchmarking strategies that considers a specific QoS metric, the devised fitness scope assessment model considers many QoS factors along with prime QoS metrics that are related to the routing context. In the best our knowledge,

the fitness scope assessing and progressive evolution strategies are used first in the class of QoS aware routes discovery. The experimental results concluding the magnified scalability, optimality and robustness of the proposed model that compared other benchmarking strategies called GAMAN and E-GAMAN. This work is inspiring us for further research. One future direction of research would be finding hybrid soft-computing strategies for QoS aware route discovery.

References Références Referencias

1. C. E. Perkins. Ad Hoc Networking, Addison-Wesley, 2001.
2. E. M. Royer, C. K. Toh. "A Review of Current Routing Protocols for Ad Hoc Mobile Wireless Networks", IEEE Personal Communications, Vol. 6, No. 2, 46–55, April 1999.
3. S. Chen, K. Nahrstedts. "An Overview of Quality of Service Routing for Next-Generation HighSpeed Networks: Problems and Solutions", IEEE Network, Special Issue on Transmission and Distribution of Digital Video, Vol. 12, No. 6, 64–79, 1998.
4. W. C. Lee, M. G. Hluchyj, and P. A. Humblet. "Routing Subject to Quality of Services Constraints in Integrated Communications Networks", IEEE Network, Vol. 9, No. 4, 46–55, 1995.
5. H. Xiao, W. K. G. Seah, A. Lo, K. C. Chua. "A Flexible Quality of Service Model for Mobile Ad-Hoc Networks," Proc. of IEEE VTC2000, Tokyo, Vol. 1, 445–449, May 2000.
6. G. S. Ahn, A. T. Campbell, A. Veres, L. H. Sun. "Supporting Service Differentiation for RealTime and Best-Effort Traffic in Stateless Wireless Ad Hoc Networks (SWAN)," IEEE Transactions on Mobile Computing, Vol. 1, No. 3, 192–207, 2002.
7. S. B. Lee, G. S. Ahn, X. Zhang, A. T. Campbell. "INSIGIA: An IP-Based Quality of Service Framework for Mobile Ad Hoc Networks," Journal of Parallel and Distributed Computing, Vol. 60, No. 4, 374–406, April 2000.
8. K. Chen, S. H. Shah, K. Nahrstedts. "Cross-Layer Design for Data Accessibility in Mobile Ad Hoc Networks," Wireless Personal Communications, Special Issue on Multimedia Network Protocols and Enabling Radio Technologies, Vol. 21, No. 1, 49–76, 2002.
9. H. L. Chao, W. Liao. "Fair Scheduling with QoS Support in Wireless Ad Hoc Networks," IEEE Transactions on Wireless Communications, Vol. 3, No. 6, 2119–2128, 2004
10. S. Chen, K. Nahrstedt. "Distributed Quality-of-Service Routing in Ad-Hoc Networks," IEEE Journal on Selected Areas in Communications, Vol. 17, No. 8, 1–18, 1999.
11. R. Sivakumar, P. Sinha, V. Bharghavan. "CEDAR: a Core-Extraction Distributed Ad-Hoc Routing Algorithm," IEEE Journal of Selected Areas in Communications, Vol. 17, No. 8, 1454–1465, 1999.
12. K. Wu, J. Harms. "QoS Support in Mobile Ad Hoc Networks," Crossing Boundaries – an interdisciplinary journal, Vol. 1, No. 1, 92–106, Fall 2001.
13. J. A. Stine, G. de Veciana. "A Paradigm of Quality-of-Service in Wireless Ad Hoc Networks Using Synchronous Signaling and Node States," IEEE Journal on Selected Areas in Communications, Vol. 22, No. 7, 1301–1321, 2004.
14. L. Chen, W. B. Heinzelman. "QoS-Aware Routing Based on Bandwidth Estimation for Mobile Ad Hoc Networks," IEEE Journal on Selected Areas in Communications, Vol. 23, No. 3, 561–572, 2005.
15. Special Issue on Computational Intelligence in Telecommunication Networks, Computer Communications, Vol. 25, No. 16, 2002.
16. L. Barolli, A. Koyama, T. Suganuma, N. Shiratori. "GAMAN: A GA Based QoS Routing Method for Mobile Ad-hoc Networks," Journal of Interconnection Networks (JOIN), Vol. 4, No. 3, 251–270, 2003.
17. D. E. Goldbergs. "Genetic Algorithms in Search, Optimization, and Machine Learning," Addison-Wesley, 1989.
18. Barolli L, Koyama A, Suganuma T, Shiratori N. GAMAN: a GA based QoS routing method for mobile Ad-Hoc networks. Journal of Interconnection Networks 2003;4(3):251–70.
19. Leonard Barolli, Makoto Ikeda, Giuseppe De Marco, Arjan Durresi, Akio Koyama and Jiro Iwashige; "A Search Space Reduction Algorithm for Improving the Performance of a GA-based QoS Routing Method in Ad-Hoc Networks"; International Journal of Distributed Sensor Networks, Taylor & Francis Group, LLC, ISSN: 1550-1329 print/1550-1477 online, 3: 41–57, 2007; DOI: 10.1080/15501320601067881
20. http://www.tc3.edu/instruct/sbrown/stat/shape.htm

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Detection and Counter Measure of AL-Ddos Attacksin Web Traffic

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Abstract- Distributed Denial-of-Service (DDoS) assaults are a developing danger crosswise over Internet, disturbing access to Information and administrations. Presently days, these assaults are focusing on the application layer. Aggressors are utilizing systems that are exceptionally hard to recognize and relieve. In this task propose another technique to recognize AL-DDoS assaults. This work separates itself from past techniques by considering AL-DDoS assault location in overwhelming spine activity. In addition, the identification of AL-DDoS assaults is effectively deceived by glimmer group movement. By analyzing the entropy of AL-DDoS assaults and glimmer swarms, these model output be utilized to perceive the genuine AL-DDoS assaults. With a quick AL-DDoS identification speed, the channel is equipped for letting the real demands through yet the assault movement is halted.

GJCST-E Classification : H.3.5

Strictly as per the compliance and regulations of:

Detection and Counter Measure of AL-Ddos Attacksin Web Traffic

R.Sreenath[α] & E.S.Phalgunakrishna[σ]

Abstract- Distributed Denial-of-Service (DDoS) assaults are a developing danger crosswise over Internet, disturbing access to Information and administrations. Presently days, these assaults are focusing on the application layer. Aggressors are utilizing systems that are exceptionally hard to recognize and relieve. In this task propose another technique to recognize AL-DDoS assaults. This work separates itself from past techniques by considering AL-DDoS assault location in overwhelming spine activity. In addition, the identification of AL-DDoS assaults is effectively deceived by glimmer group movement. By analyzing the entropy of AL-DDoS assaults and glimmer swarms, these model output be utilized to perceive the genuine AL-DDoS assaults. With a quick AL-DDoS identification speed, the channel is equipped for letting the real demands through yet the assault movement is halted.

I. Introduction

A Denial-of-Service (DoS) assault is an endeavor by aggressors to keep the true blue clients from utilizing the data administration. In a DDoS assault, these endeavors originate from an extensive number of circulated hosts that organize to surge the exploited person with a plenitude of assault bundles all the while. Conveyed foreswearing of-administration (DDoS) assaults present genuine dangers to servers in the Internet. DDoS assaults include in soaking the target machine with appeals, such that it can't react to authentic movement. Such assaults for the most part prompt a server over-burden.

To dispatch a DDoS assault, the aggressors first creates a system of bargained PCs that are utilized to produce the colossal volume of activity expected to refuse any assistance to honest to goodness clients of the victimized person. At that point the aggressor introduces assault apparatuses on the bargained hosts of the assault system. The hosts running these assault apparatuses are known as zombies, and they can be utilized to complete any assault under the control of the aggressor. The vast majority of the current procedures can't segregate the DDoS assaults from the surge of honest to goodness getting to.

Generally, DDoS assaults are completed at the system layer. As of late, there are an expanding number of DDoS assaults against online administrations and Web applications.

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These assaults are focusing on the application level. Application layer DDoS assaults may concentrate on debilitating the server assets, for example, Sockets, CPU, memory, circle/database data transmission, and I/O transfer speed. These assaults are normally more productive than TCP or UDP-based assaults, obliging less system associations with accomplish their malevolent purposes. They are likewise harder to distinguish, both on the grounds that they don't include a lot of activity and in light of the fact that they appear to be like ordinary kind movement.

II. Rival Methods

- We have adopted a hidden semi-Markov process to present the behavior of Internet users .The hidden semi-Markov approach is a complex algorithm. When users visit a website, it traces and records the whole visiting history of each user.
- It is noticeable that the hidden semi-Markov method is unlikely to perform effectively in backbone traffic.
- Another typical approach against AL-DDoS attacks is to use CAPTCHA. This method requires users to recognize strings in a fuzzy picture and submit a response to a web server for authentication. However, users sometimes consider this operation as a negative experience to surf the Internet.
- The introduced wavelets to identify anomalies in network traffic. But wavelet analysis is generally a post-mortem analysis and cannot be used for online processing.

Previously proposedsignal analysis of network traffic anomalies mechanism to voluntarily increase the bandwidth utilization of legitimate users. However, this approach cannot reduce the network congestion and the load of web servers. A countermeasure that consisted of a suspicion assignment process and a DDoS-resilient scheduler.

The suspicion process assigns a continuous 'valued vs. binary' measure onto each client session. It further utilizes these values to determine if and when to schedule the requests of a session. However, this approach is still too time-consuming to detect AL-DDoS attacks in large volume traffic.

III. Proposed System

In this paper, we are motivated to design a defense system at the backbone level. This system is

able to detect AL-DDoS attacks targeting Internet web servers. Currently, most of these web servers are deployed together in a data center connecting directly to the backbones. Thus, it is critical to implement an effective method to detect AL-DDoS attacks and filter the malicious traffic in backbones before they causes detriments to the web servers. The proposed system has low complexity and can real-timely run in high volume traffic.

One way to protect from DoS attacks is to allow only authorized clients to access the web server. Compared with non-attack cases, the number of requests in a session increases significantly in a very short time period in DDoS attack cases. Considering the above two issues, a hybrid approach for countering application layer DDoSatttacks is proposed. This approach gives priority to the good (legitimate) clients, while severely limiting the access to the attackers.

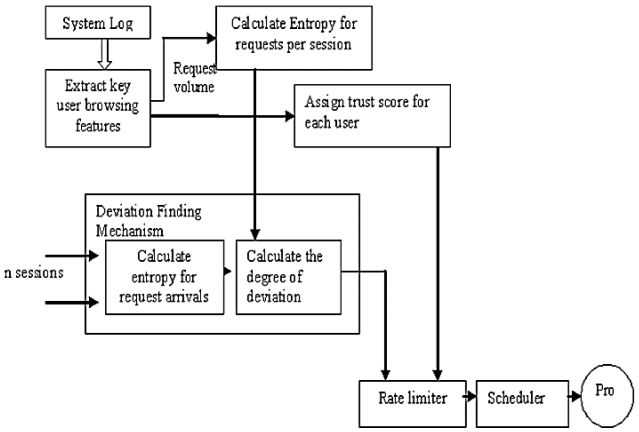
Each client is assigned with a trust value by the server based on the access behavior. A client's trust value is embedded in a HTTP cookie that is included in all server responses to the client. Using the cookie, a legitimate client can include the trust value in all its future requests to identify itself to the server. A client presenting a valid trust value to the server will be given the priority over other requests. New clients are assumed to be assigned with the lowest trust value by default by the server and updated in the response. The trust value varies according to the access pattern of the client. The trust values are assigned in such a way that

trustattacker<trustnew user <trustlegitimate user

In addition, the user's browsing behavior in multiple aspects is extracted from the system log during non-attack cases. Then the entropy of requests per session is calculated. Entropy is an information theoretical concept, which is a measure of randomness. The entropy is employed in this paper to measure changes of randomness of requests in a session for a given time interval. Entropy is applied as a second layer of filtering the suspicious flow. The second filtering mechanism is required to identify an attacker who acts like a legitimate client because, an attacker may behave benignly until it attains a highest trust value and then begin to misbehave.

The detection mechanism is deployed at the server. A session connection request first reaches the system, and then the proposed scheme either drops or forwards the requests based on the trust value obtained in the past session, calculates the entropy deviation of request rate. If the deviation is more (exceeds threshold), then drop the session immediately. Otherwise, schedule the session based on the system workload and the trust value of the user. The client who behaves better in past session will obtain higher degree of trust. The highest trust value first policy is used to schedule the requests for the server.

IV. Block Diagram



The above figure shows system architecture of the application. A session connection request first reaches the system, and then the proposed scheme either drops or forwards the requests based on the trust value obtained in the past session, calculates the entropy deviation of request rate. If the deviation is more (exceeds threshold), then drop the session immediately. Otherwise, schedule the session based on the system workload and the trust value of the user. The client who behaves better in past session will obtain higher degree of trust. The highest trust value first policy is used to schedule the requests for the server.

Analogy The detection of DDoS attack is carried out as follows:

- Initially, the client embeds its trust value ($Trust_{old}$) on the session request (rxy) and sends it to the server.
- The server, on receiving the session request, validates the trust value.
- If valid, it forwards the request (r_{xy}).
- Otherwise, the session is considered suspicious and dropped.
- Then the entropy (H(R)) for the incoming requests in a session is calculated and the degree of deviation with the predefined value is estimated.
- The greater the deviation, the more suspicious the session is.
- If the session is found suspicious, then it is assigned with the lowest trust value and dropped immediately.
- Otherwise, the requests are scheduled to get the service from the web server.
- The trust value($Trust_{new}$) is updated and embedded in the response message of the server for future use.

V. Applying Formulas & Generation of Results

a) Trust value computation

Once the request is accepted, the request is forwarded to the application. When the server sends a response to the client, it updates the trust value as follows:

Let *req* be the client's request and *res* be the corresponding response generated by the server. Let t_{rs} be the time taken by the server to respond for the request *req* and *ut* denotes the utility of the request, *req*.

In this approach, a simple benefit function[2] is used.

$$B(req) = ut - \gamma * t_{rs} \ldots. \quad (1)$$

Where γ is a tunable parameter.

Here, additive increase multiplicative decrease strategy is used to calculate the new trust value.

If B(req) > 0, then the new trust value is computed as follows:

$$Trust_{new} = trustold + \alpha * B(req) \ldots..(2)$$

Otherwise,

$$Trust_{new} = trust_{old} /(\beta(1-B(req))) \ldots.(3)$$

The additive increase ensures that the trust value slowly increases as the client behaves benignly; while the multiplicative decrease ensures that the trust value drops very quickly upon detecting a DoS attack from the client.

b) Entropy calculation

Let the request in a session be denoted as r_{xy}, where x, y I, a set of positive integers. 'x' denotes the request number in session 'y'. Let $|(r_y,t)|$ denote the number of requests per session y, at a given time t. Then,

$$|(r_y,t)| = \sum_{i=0}^{n} rxy \ldots.(4)$$

For a given interval Δt, the variation in the number of requests per session y is given as follows;

$$N_y(r_y, t+\Delta t) = |(r_y, t+\Delta t)| - |(r_y, t)| \ldots. (5)$$

The probability of the requests per session y, is given by

$$P_y(r_y) = N_y(r_y, t+\Delta t) / \sum_{x=1}^{n} \sum_{y=1}^{n} Ny(ry, t + \Delta t) \ldots(6)$$

Let R be the random variable of the number of requests per session during the interval Δt, therefore, the entropy of requests per session is given as

$$H(R) = -\sum_{y} P_y(r_y) \log P_y(r_y) \ldots(7)$$

Based on the characteristics of entropy function, the upper and lower bound of the entropy H(R) is defined as $0 \leq H(R) \leq \log N \ldots(8)$

where N is the number of the requests.

Under DoS attack, the number of request increases significantly and the following equation holds

$$|H(R) - C| > \text{threshold}, t \ldots(9)$$

Where C is the maximum capacity of the session.

c) Rate Limiter

To avoid falsely detection, rate-limiter is introduced. Once the entropy is calculated, compute the degree of deviation from the predefined entropy. The system first sets a threshold for acceptable deviation. If the computed deviation exceeds the threshold, then the session is forced to terminate immediately. Otherwise, second level filter is applied by the rate limiter. The system also defines a threshold for validating a user based on the trust score. A user is considered to be legitimate only if the trust score exceeds the threshold. Otherwise, the user is considered malicious and the session is dropped immediately. The legitimate sessions are then passed to the scheduler for getting service from the server.

d) Scheduler

If the user is legitimate, then the scheduler schedules the session based on the highest trust value first (user with highest trust value) policy. The well-behaved users will have a little or no deviation. In such case, the legitimate user gets a quicker service. In addition to the scheduling policy, system workload is also considered before scheduling the request for getting service.

e) Algorithms

Algorithm to compute the entropy from system log

Input: system log

1. Extract the request arrivals for all sessions, page viewing time and the sequence of requested objects for each user from the system log.
2. Compute the entropy of the requests per session using the formula:

$$H(R) = -\sum y\ P_y(r_y) \log P_y(r_y)$$

a. Detection Algorithm

Input the predefined entropy of requests per session.

Define the threshold for allowable deviation (Td)
For each session waiting for detection
Extract the trust value from the request
Validate the trust value
  If the trust value issued is valid
    Extract the requests arrivals
    Compute the entropy for each session using (7)

$$H_{new}(R) = -\sum y\ P_y(r_y) \log P_y(r_y)$$

Compute the degree of deviation

$$D = |H_{new}(R)| - |H(R)|$$

If the degree of deviation is less than the allowable threshold (Td), then

Allow the session to get service from the web server

Update the trust value

Embed the trust value in the response message and send it to client

Else

The session is malicious; drop it

Else

Assign the lowest trust value to the client Drop the session

b. Expected Table

Table 1: shows the results of client IP address

Client IP Address	Trust value	Degree of derivation	Policy	Attack Type
172.016.112.100	4	20%	legitimate client	no
194.027.251.021	5	10%	legitimate client	no
135.008.060.182	1	50%	suspicious	Ntis attack
.....	....	....	....	
.....	....	....	....	

VI. Conclusion

In this paper, an effective and efficient hybrid scheme against DDoS attacks based on trust value and information metric (entropy) is proposed. This approach not only counters the illegitimate flows but also avoids the flooding of the legitimate flows. Further is add detect trust value is used to detect the legitimate user from the attackers at the first level. Then, based on the information metric of the current session, the sessions that are assumed to be suspicious are dropped. The legitimate flows are then scheduled by the scheduler based on the system workload the trust value of the client. Thus the legitimate clients gets more priority in accessing the information and services.

References Références Referencias

1. Wei Zhou, WeijiaJia, ShengWen, YangXiang, Wanlei Zhou "Detection and defense of application-layer DDoS attacks in backbone Web traffic" Future Generation Computer Systems Vol 38(2014) pp.36–46.
2. S. Renuka Devi, P. Yogesh" A Hybrid Approach to Counter Application Layer DDoS Attacks" International Journal on Cryptography and Information Security (IJCIS), Vol.2, No.2, June 2012.
3. Arbor. Networks, "Worldwide network infrastructure security report," Tech. Rep., Arbor Networks, 2011.
4. Y. Xie, S. Zheng Yu, "A large-scale hidden semi-Markov model for anomaly Detectionon user browsing behaviors, "IEEE/ACM Trans.Netw. 17 (1) (2009) 54–65.
5. L.von Ahn, M. Blum, N.J. Hopper, J. Langford," Captcha: using hardai problemsFor security, in: EUROCRYPT," Vol 2003, pp. 294–311.
6. S. Kandula, D. Katabi, M. Jacob, A. Berger, "Botz-4-sale: surviving organized Ddos attacks that mimic flash crowds, in: Proceedings of the 2nd Conference On Symposiumon Networked Systems Design and Implementation," NSDI'05,USENIX Association, Berkeley, CA, USA, 2005, pp.287–300.
7. P. Barford, J. Kline, D. Plonka, A. Ron,"A signal analysis of network traffic anomalies, in: Proceedings of the 2nd ACMSIGCOMM Work shop on Internet Measurement," IMW' 02, ACM, New York, NY, USA, 2002, pp. 71–82.
8. M. Walfish, M. Vutukuru, H. Balakrishnan, D. Karger, S. Shenker, "DDoS defense by offense," ACM Trans. Comput. Syst. 28 (1) (2010)1–54.
9. S.Ranjan, R. Swaminathan, M. Uysal, E. Knightly,"DDoS-resilient scheduling to counter application layer attacks under imperfect detection, in: Proceedings". INFOCOM 2006. 25th IEEE International Conference on Computer Communications, 2006, pp.1–13.
10. Y. Xie, S. ZhengYu, "Monitoring the application-layer ddos attacks for popular websites," IEEE/ACM Trans. Netw. Vol 17(1) (2009) pp. 15–25

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Web usage Mining: A Novel Approach for Web user Session Construction

By Neha Sharma & Pawan Makhija
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Abstract- The growth of World Wide Web is incredible as it can be seen in present days. Web usage mining plays an important role in the personalization of Web services, adaptation of Web sites, and the improvement of Web server performance. It applies data mining techniques to discover Web access patterns from Web log data. In order to discover access patterns, Web log data should be reconstructed into sessions. This paper provides a novel approach for session identification.

Keywords: web mining, web server logs, web usage mining (wum), preprocessing, session identification.

GJCST-E Classification : H.3.5

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Web usage Mining: A Novel Approach for Web user Session Construction

Neha Sharma [α] & Pawan Makhija [σ]

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I. Introduction

Web Usage Mining deals with understanding of user behavior, while interacting with web site, by using various log files to extract knowledge from them. This extracted knowledge can be applied for efficient reorganization of web site, better personalization and recommendation, improvement in links and navigation, attracting more advertisement. As a result more users attract towards web site hence will be able to generate more revenue out of it. [1]. Web Usage mining is made up with three procedures, as data preprocessing, data mining and pattern analyzing. Data preprocessing contains three steps as data cleaning, user identification, session identification. Session identification is an important step in data processing of web log mining. A session is defined as a group of requests made by a single user for a single navigation. A user may have a single or multiple sessions during a period of time. Presently sessions are identified either on Time based method or Navigation based method. Here, we proposed a novel approach for user session identification by combining both Time based method and Navigation based method.

II. Motivation

Web log mining is to discover the mode of users' accessing to web page through mining web logs. In the process, the designer's knowledge fields, the rate of his interesting and the users' visiting habit can be refined, which can optimize the site's structure, develop individual service and the control of the users that is useful strategies information for the designers and the managers. The most important and time- consuming link in mining web logs is the session identification in web log preprocessing. The users' session is a session aggregation covering more than one web services. The aim of session identification is to divide the users' page into an isolated identification.

III. Related Works

The focus of literature review is to study, compare and contrast the available session identification techniques. Traditional session identification algorithm is based on a uniform and fixed timeout. The set of pages visited by a specific user at a specific time is called page viewing time. It varies from 25.5 minutes to 24 hours while 30 minutes is the default timeout by Cooley [2]. If the interval between two sequential requests exceeds the timeout, new session is determined.

Timeout algorithm uses a pre-fixed value of threshold for session identification in which if the interval between two sequential requests exceeds the threshold value, a new session is determined. According to He Xinhua and Wang Qiong [3], However, because of the uniform and fixed value, the algorithm cannot obtain efficient effect of session identification in several situations like (1) Different user results different reading speeds, (2) Even by the same user, different interest is shown on pages at different time, (3) Different page contains different contents. Therefore, the time taken is often different. They propose a session identification algorithm based on dynamic timeout, on the basis of traditional session identification algorithm. First, at beginning of the new session, the initial timeout is set for each page using the formula

$$\delta 0 = \alpha.t.(1 + \beta)$$

Where α denotes smooth coefficient ranging from 1.1 ~ 1.6 and β is an influence factor depend on link in and link out of the page.

Second, while requested page is put into the current session, the timeout will be recomputed selectively in order to make the timeout reflect the character of session using the formula

$$\delta' = \delta 0(tnew + t0) / 2t0$$

Where *t0* denotes primal timeout of the page, and *tnew* denotes the timeout of the page that put into

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current session and δ0 denotes the timeout by the adjustment last time.

In [7] Jozef Kapusta, Michal Munk and Martin Drlík, assume that the user goes over several navigation pages during her/his visit until she/he finds the content page with required information. The content page is a page where the user spends considerably more time in comparison with navigation pages. The content page is considered, the end of the session. The division of pages into content and navigation pages is based on the calculation of cut-off time C. When the cut-off time C is known the session can be created in such manner that we compare the time of particular web page visit with the cut-off time C. The session is then defined as a path through the navigation types of pages to the content page (the user spent there more time then C), they claim the content page is last page of session. The cut-off time C is calculated on the basis of exponential distribution of variable RLength(Time spent by user on individual page), here the assumption is that the variance of the times spent on the auxiliary pages is small then the content page.

In [8] Zhixiang Chen, Richard H. Fowler and Ada Wai-Chee Fu, designed two algorithms for finding maximal forward references (longest sequences of Web pages visited by a user without revisiting some previously visited page in the sequence) from very large Web logs. They consider two types of sessions as α-interval session and β -gap session,

where α-interval session insures the duration of a session may not exceed a threshold of (30 minute) and β-gap session insures the time between any two consecutively assessed pages may not exceed a threshold of β (20 minute). They define a URL node structure to store the URL and the access time of a user access record and a pointer to point to the next URL node and then the maximal forward reference session is calculated using both interval session and gap session.

In [9] G. Arumugam, S. Sugana,Suggested algorithm which does not require searching whole tree representing server pages. They employs concept of efficient use of data structure. Array List to represent web logs and user access list, hash table for storing server pages, two way hashed structures for Access History List, represents user accessed page sequences. Experiments reveals less time complexity and good accuracy of sessions generated as compare to results of maximal forward reference method and reference length method.

In [10] Dr.Antony and V.Chitraa, proposed a new technique for identifying sessions for extraction of user patterns. In the proposed method a matrix is constructed in which columns are the web pages and rows are users. Browsing time (BT) for a particular page is determined by finding the differences between the time fields of two consecutive entries of a same user and assumption is that the website Administrators fix the minimum time and maximum time (BTmin and BTmax) for all web pages as per the contents. Codification of pages are performed on the basis of BT, BTmin and BTmax and the sessions are calculated on the basis of this code. The result is shown in the form of matrix.

In [11] Peng Zhu, Ming-sheng Zhao proposed an improved algorithm based on average time threshold value. Experiments are conducted on the log files of Nanjing University Extra net user access logs. Because data of log files are very large, They selected the log test algorithm of only one day(March 15, 2008). Algorithm proposed in this paper, takes individual differences into account to define the threshold value of users' browsing pages, and identify long session page views, and divide the session less than the threshold into the next session. They proposed two algorithms from which first algorithm constructs session of individual user and the second algorithm disconnect the previous session into parts if there is no hyper link between two consecutive entries of logs.

IV. Proposed Approach

As we seen in the literature review the sessions are identifying either on the basis of time spend by user on particular web page or on the basis of user navigation in web site topology.

Time based method ignores the web site structure, the sessions generated by such type of methods are not generated right sessions as users reading speeds reflects the sessions. While in navigation method if particular user not moves back,it not generates the sessions.

In our approach we combine both method to generate more informative sessions. Initially sessions are generated by Maximal Forward reference method on these sessions the time based method have been applied with the threshold value of 10 minutes. The experiment is conducted on the log data of www.smartsync.com of dated 8 Dec 2013.

V. Testing and Results

The input data in this case are the access log files of the www.smartsync.com web server. Because data of log files are very large, we select the log test dataset of only one day (dated 8 Dec 2013) of size 1 GB, 2 GB and 4 GB. The Table-1 showing the number of session generated by existing approach and our approach.

Table1: Number of Sessions generated by various method

Name of Method	No. of Session generated 1 GB Dataset	2 GB Dataset	4 GB Dataset
1.Time based Method	983	1673	2875
2.Maximal Forward reference method	968	1640	2742
3.Proposed Approach	1120	1710	3102

Since the log data is very large in size it is not possible to count true sessions of whole data so we took 100 KB of data. In that data we manually found 53 true sessions and the number of session generated by the existing methods and the proposd method are compared. For finding the accuracy of proposed approach we have calc`ulated the ratio of generated session and true session. Table-2 showing the comparison of existing method and proposed method with true sessions. In the Table-2 S is number of sessions generated by methods and T is the true sessions counted manually.

Table 2 : Comparison of Session Generated by Existing Methods and Proposed Method with True Sessions

Methods	S	T	S/T %
Time based Method	42	53	79 %
Maximal Forward reference method	32	53	60 %
Proposed Approach	47	53	88 %

VI. Conclusion

The growth of the web has resulted in a huge amount of information that is now freely offered for user access. The several kinds of data have to be handled and organized in a manner that they can be accessed by several users effectively and efficiently. The experiment on 4 GB data shows that the new method proposed in this report generates more sessions (3102) than the traditional Time Based Method (2875) and Maximal Forward Sequence Method (2742). On comparing with the true sessions on 100 KB data, the accuracy of session is increased to 88%.

References Références Referencias

1. Chintan R. Varnagar, Nirali N. Madhak, Trupti M. Kodinariya, Jayesh N. Rathod, "Web Usage Mining: A Review on Process", IEEE 2013.
2. Robert.Cooley,Bamshed Mobasher, and Jaideep Srinivastava, " Web mining: Information and Pattern Discovery on the World Wide Web", *In International conference on Tools with Artificial Intelligence*, pages 558-567, Newport Beach, IEEE,1997.
3. He Xinhua, Wang Qiong, "Dynamic Timeout-Based A Session Identification Algorithm" , IEEE 2011.
4. J. Zhang, Ali A. Ghorbani, "The Reconstruction of user session from a server log using improved time oriented heuristic", *IInd Annual Confernnce on Communication Networks and Service Research*, IEEE, 2004.
5. Fang Yuankang and Huang Zhiqui, "A session identification algorithm based on frame page and page threshold", *Computer Science and Information Technology (ICCSIT)*, 3rd IEEE International Conference, 2010
6. R. F. Dell et al.,"Web user session reconstruction using integer programming", International Conference on Web Intelligence and Intelligent Agent Technology, IEEE/ACM/WIC, 2008.
7. Jozef Kapusta, Michal Munk, Martin Drlík, "Cut-off Time Calculation for User Session Identification by Reference Length" IEEE 2012.
8. Zhixiang Chen, Richard H. Fowler and Ada Wai-Chee Fu," Linear Time Algorithms for Finding Maximal Forward References", *Intl Conf On Info Tech: Coding and Computing (ITCC03)*, Proc. of the 2003 IEEE.
9. G. Arumugam, S. Sugana, "Optimum algorithm for generation of user session sequences using server side web user logs", IEEE, 2009.
10. Dr.Antony Selvadoss Thanamani, V.Chitraa, "A Novel Technique for Sessions Identification in Web Usage Mining Preprocessing", *International Journal of Computer Applications*, Volume 34– No.9, November 2011.
11. Peng Zhu, Ming-sheng Zhao," Session Identification Algorithm for Web Log Mining", IEEE 2010.
12. Nirmala Huidrom, Neha Bagoria, "Clustering Techniques for the Identification of Web User Session", *International Journal of Scientific and Research Publications*, Volume 3, Issue 1, January 2013.

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Power aware Routing Protocol for Manets based on Swarm Algorithm

By L. Yoga Vishnu & V.V. Rama Prasad
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Abstract- Creating any standard protocol having 2 or more QoS limitations might be described as an NP-complete. Swarm technology is used to solve such problem. Even so, to fix difficult problems using swarm algorithms, how many iterations essential is going to be proportional for you to problem complexity. In this a standard protocol is presented depending on hybrid swarm algorithm standard protocol. This protocol has higher bundle overheads which more often than not bring about devouring higher battery power. In the present work to reduce the higher battery power , power aware routing protocol is developed based on Swarm algorithm.

Keywords: *SMART, routing protocol, power aware, ad hoc networks.*

GJCST-E Classification : *C.2.2*

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Power aware Routing Protocol for Manets based on Swarm Algorithm

L. Yoga Vishnu [α] & V.V. Rama Prasad [σ]

Abstract- Creating any standard protocol having 2 or more QoS limitations might be described as an NP-complete. Swarm technology is used to solve such problem. Even so, to fix difficult problems using swarm algorithms, how many iterations essential is going to be proportional for you to problem complexity. In this a standard protocol is presented depending on hybrid swarm algorithm standard protocol. This protocol has higher bundle overheads which more often than not bring about devouring higher battery power. In the present work to reduce the higher battery power , power aware routing protocol is developed based on Swarm algorithm.

Keywords: SMART, routing protocol, power aware, ad hoc networks.

I. Introduction

MANET comprises of a few portable remote hubs that speak with one another through immediate or circuitous correspondence joins. Hubs inside these systems demonstration like switches. The non-attendance of foundation and the portability of these hubs create a huge test to steer calculations in such systems. A node in the MANET is controlled on battery. Minimizing correspondence related force utilization is an essential planning routing protocol. Routing protocol assumes huge part in deciding system execution.

The ad hoc on demand distance vector routing convention is a responsive unicast steering convention for versatile impromptu systems. As a receptive steering convention, AODV just needs to keep up the directing data about the dynamic ways. In AODV, the steering data is kept up in the directing tables at all the hubs. Each portable hub keeps a next bounce steering table, which contains the destinations to which it as of now has a course. A directing table passage terminates in the event that it has not been utilized or reactivated for a pre specified close time On demand tree based routing protocol used to combining the levels of node by node by using the algorithm is Tree based optimized flooding .Which can be used to increase the connectivity and extending the network lifetime.

Routing algorithms in these systems can be characterized into three primary gatherings, proactive, receptive and hybrid steering conventions . A proactive routing protocol is a table driven directing convention where all hubs are obliged to have complete information about the system and therefore directing tables are intermittently updated. On the other hand, reactive conventions set up courses on requests. At whatever point a hub obliges a course to a particular destination, it begins course setup method. Course revelation prepares more often than not comprises of television a course demand message all through the network. Hybrid routing conventions tries to address the issue in both receptive and proactive by consolidating highlights from both responsive and proactive conventions into a crossover convention. A case of crossover directing convention is zone routing. The primary downside of hybrid routing convention is the high asset use.

II. Related Works

A routing protocol is a development process that tries to improve system performance. In AODV acquainted with tackle directing issue. AODV is a standout amongst the most well known traditional directing conventions for portable specially appointed systems. At whatever point a hub needs to send information to a destination, and it doesn't have the legitimate course to destination, it telecasts a Route Request (RREQ) message to discover the destination. After accepting RREQ, Route Replay (RREP) message is sent back to the source. AODV in its unique structure utilizes hi message to intermittently redesign its neighbour hubs accessibility. Join breakage could be distinguished in the event that unsuccessful parcel transmission happens or missing hi message. If there should be an occurrence of connection disappointment the hub send back a Route Error (RERR) to the source to scan for new course.

RFD is a subset of swarm knowledge. Actualizing the RFD calculation in impromptu steering conventions gives numerous preferences. As a matter of first importance, as there are no retrogressive specialists in the RFD calculation, it will diminish the aggregate number of control bundles in the system. Another preference is the straight forwardness of the calculation, particularly it relates heights to hubs instead of connections. As for the most part the quantity of the hubs is typically not exactly the number of connections in a system. This minimizes the asset use.

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The hybrid swarm algorithm has been proposed for routing problems in MANETs. This protocol has higher bundle overheads which more often than not bring about devouring higher battery power, For this power aware routing protocol is developed.

Distinctive power mindful routing conventions have been proposed to take care of steering issues in specially appointed system .Probabilistic examination is utilized to demonstrate the impact of multi-client obstruction with and without appropriate force control of system execution. The creators ponder the impact of obstruction, force control and diverse sending technique on system lifetime. Two systems for parcel sending present by the creators, power controlled nearest forward (PCN) and system lifetime expanding PCN (E-PCN). These systems attempt to expand the system lifetime.

III. Motivation

The various characteristics of MANETs, like dynamic and changing topology, foundation less and remote correspondence media, adds additional many-sided quality to routing protocol with a specific end goal to locate the ideal way to satisfactory QoS in the middle of source and destination hubs. Move process in such a method is tests matter specially if how much offered interfaces is limited. The problem connected with acquiring a well balanced means taking into consideration interconnection characteristics involving hubs obliges re-examination.

Giving information bundles the capacity to gather course data, and join with control, parcel during the time spent discovering an ideal way could upgrade system execution. Subsequently, this will issue them the capacity to move and quest for their own particular destinations.

IV. Problem Statement

The hybrid ACO and RFD standard protocol have higher packet overheads which for the most part results in consuming higher battery power. To reduce the higher battery power , power aware routing protocol is developed based on Swarm algorithm.

V. Problem Formulation

The hybrid ACO and RFD standard protocol have higher packet overheads which for the most part results in consuming higher battery power.

To reduce the higher battery power, power aware routing protocol is developed based on Swarm algorithm without the partition of routing data, Where energy trademark is changed over to altitude parameters. Packets are sent by remaining power in hubs. The convention moreover outputs for the briefest and non-congested approach to destination. This will reduce the quantity of retransmission in the system which saves power.

VI. Mathematical Model

In the RFD algorithm route will be discovered using following equations

For source node

$$Alts(j) = Alts(j) - \mu(Alts(j) - Broadalt), \mu \in [0,1]$$

For destination node

$$Altd(j) = minil€V(altd(l)) – gradient *(minil€V(altd(l)) - altd(i))$$

Average time to send a packet is

$$Dk(t) = \gamma Dk(t-1)+(1-\gamma)Nk(t), \ \gamma \in [0,1]$$

In RFD Hello message is utilized to find neighbour hubs and to propagate data around the system.

$$Altd(j) = Altd(j) – \mu(altd(j) – Halt\ d), \mu \in [0,1]$$

The measure of disintegration is relative to remaining battery control in the hub and the height angle between the hub itself and the selected sending hub.

$$Ed(j) = \alpha * Pr/ P(Altd(j) - Altd(k))$$

a) River Formation Dynamics Algorithm

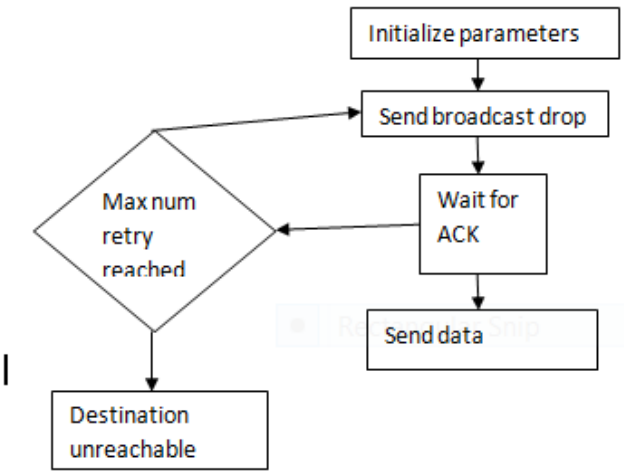

Figure 1 : Flow chart for the Source node

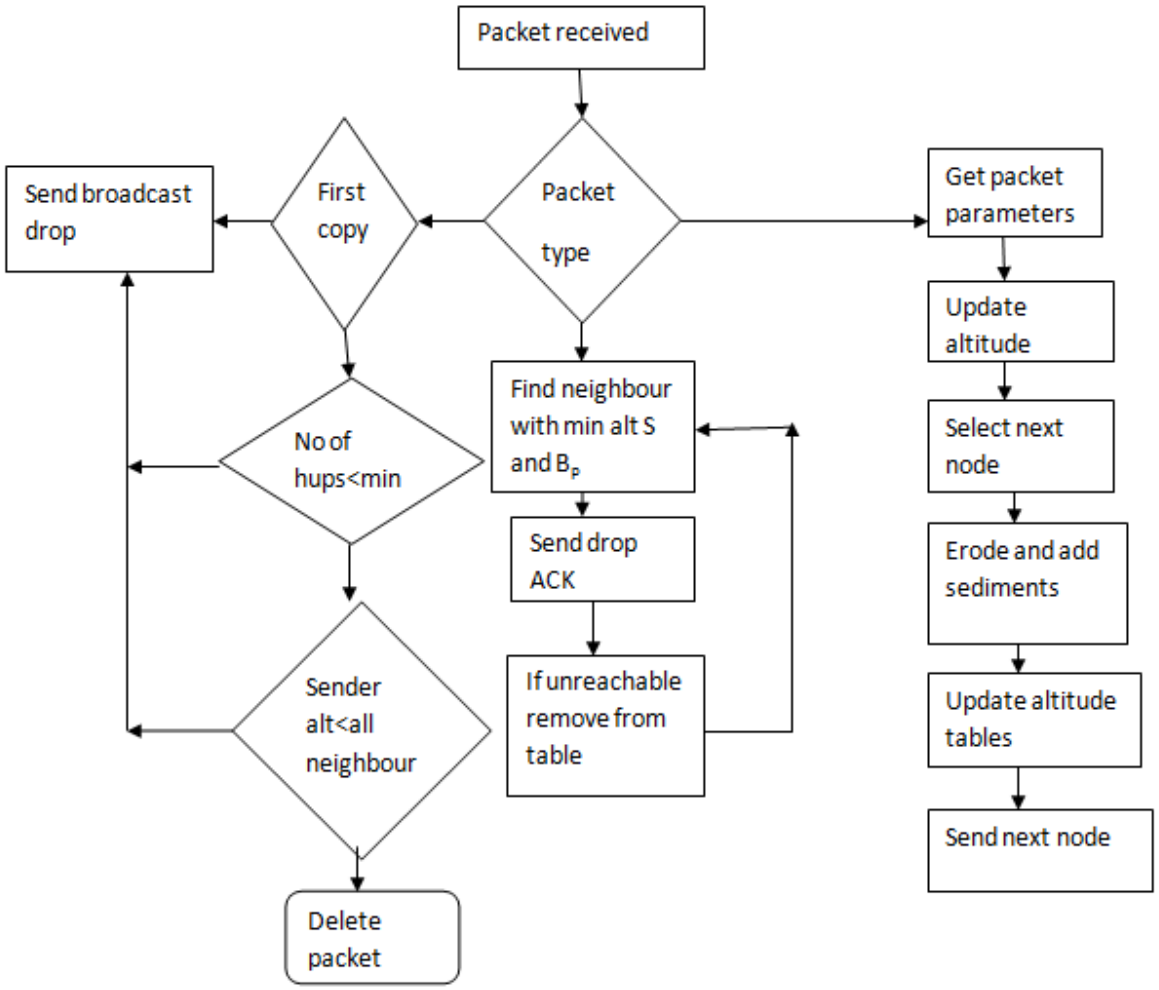

Figure 2 : Flow chart for Intermediate node

VII. Implementation and Simulation Results

With a specific end goal to assess the execution of our proposed convention, the protocol executed utilizing OMNet++ as simulation programming. For the AODV convention, the INETMANET add-on bundle of the OMNet++ is utilized. In a scope of tests, proposed routing protocol has been compare with AODV.

a) Results

Fig 1 shows throughput of the proposed convention with AODV protocol for diverse estimations of hubs speeds. It obviously represents that smart routing protocol accomplishes higher throughput than AODV protocol under RWP and GM portability. As the pace of hubs expands, the likelihood of connection break builds, this thusly, diminishes the system throughput. We can like wise watch that both conventions throughputs get to lower at rapid.

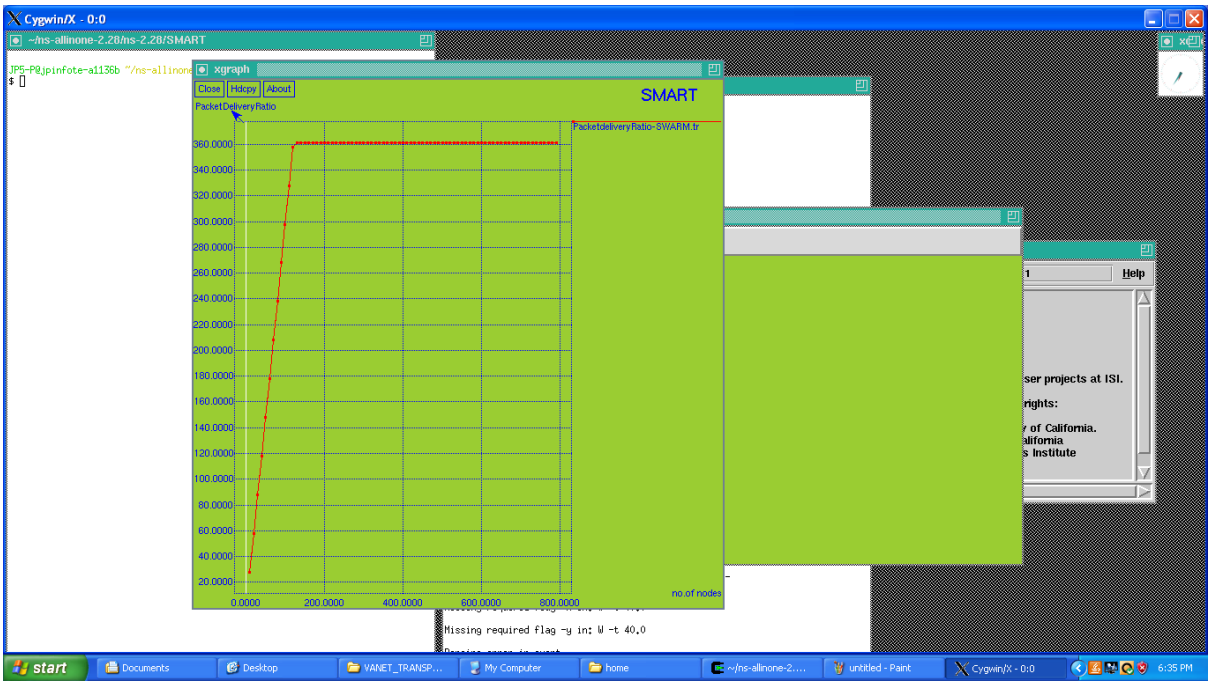

Figure 3 : Average throughputs under various speeds

SMART protocol is a hybrid protocol and it sends control messages all through the whole information session so as to keep up the course between the source and the destination. This can create all the more overhead in the system and costing the system to utilize more assets. Fig 2 demonstrates the control parcel overhead of both protocols under RWP mobility. SMART protocol produces more control overhead than AODV protocol.

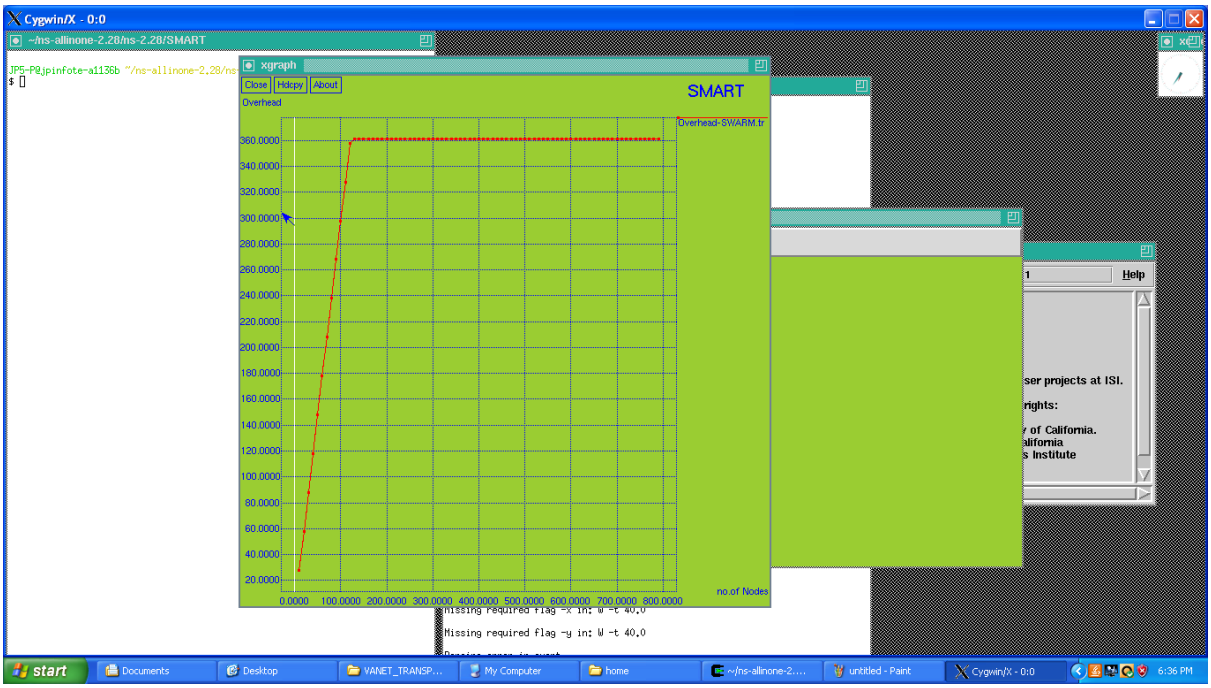

Figure 4 : control Packet overhead under various speeds

VIII. Conclusion

In this work, Swarm algorithm based SMART protocol we have been. The proposed protocol is power mindful where packets are directed through less congested range of the system to save power. In the mean time the convention detects the remaining battery power of the hubs and inclines towards hubs with higher battery level. The convention is taking into account RFD swarm algorithm. This algorithm is developed from

raindrops and how they shape streams , Which thus discover best and most brief way to the ocean.

References Références Referencias

1. P. Lalbakhsh, B. Zaeri, A. Lalbakhsh and M.N. Fesharaki, "AntNet with reward-penalty reinforcement learning", Journal of Communication Systems and Networks (CICSyN), 2010, pp. 17–21.
2. P. Rabanal, I. Rodriguez and F. Rubio, "Finding minimum spanning/ distances trees by using river formation dynamics", Journal of Ant Colony Optimization and Swarm Intelligence, vol. 5217, Springer, Berlin Heidelberg, 2008, pp. 60–71.
3. P. Rabanal, I. Rodríguez and F. Rubio, "Using river formation dynamics to design heuristic algorithms", Journal of Computer Scienc,. 4618 (2007) 163–177.
4. B. Blanco, F. Liberal and I. Taboada, "Suitability of ad hoc routing in WNR: performance evaluation and case studies", Journal of Ad Hoc Network. 11 (3) (2013) 1165–1177.
5. P. Rabanal, I. Rodriguez, "Hybridizing river formation dynamics and ant colony optimization", vol. 5778, Springer, 2011, pp. 424–431

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Improved Interoperability in Heterogeneous Nodes for MANETs

By T. V. Krishna Reddy & Mr K. S. Ranjith M.E
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Abstract- By using the power aware heterogeneous routing protocol to establish routes between heterogeneous nodes. Protocol used to analyze the nodes residual energy and power cost. The existence of multiple routes between nodes, selecting the node with less power consumption is used to select the appropriate route to maintain interoperability between nodes. The source to destination communication can be done by the intermediate nodes. Multi-interfaced node with low energy could continue to fall on optimal routes and such a node could offer a link between heterogeneous nodes where no other link is possible. Thus such a node could suffer energy shortage and fade out from the network. This approach is to integrate update messages to the proposed messages which allow a node to transmit from source to neighbouring nodes with its residual energy status and enforce the modification of power cost associated with routes.

Keywords: Interoperability, heterogeneous, nodes, energy consumption, residual energy.

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Keywords: Interoperability, heterogeneous, nodes, energy consumption, residual energy.

I. Introduction

Remote cell frameworks have been being used since 1980s.we have seen their developments to in the first place, second and third era's remote frameworks. These frameworks work with the backing of a brought together supporting structure, for example, an entrance point. The remote clients can be associated with the remote frame work by the assistance of these entrance focuses, when they meander from one spot to the next.

The versatility of frameworks is constrained by the vicinity of an altered supporting direction. It implies that the innovation can't work effectively in that places where there is no perpetual framework. Simple and quick organization of remote systems will be normal by the future era remote frameworks. This quick system organization is impractical with the current structure of present remote frameworks.

Late head ways, for example, Bluetooth presented a crisp kind of remote frame works which is every now and again known as versatile specially appointed systems. Versatile impromptu systems or "short live" systems control in the nonexistence of perpetual framework. Portable specially appointed system offers speedy and level system arrangement in conditions where it is impractical something else.

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Impromptu is a Latin word, which signifies "for this or for this just". Mobile specially appointed system is a self-ruling arrangement of versatile hubs joined by remote connections; every hub works as an.

II. Related Work

Past and late deal with heterogeneous MANET steering conventions have not characterized heterogeneity obviously (Al Aamri et al., 2010; Avudainayagam et al., 2003; Clausen and Jacquet, 2003;

Fujiwaraetal.,2012;Kunz,2008;Liuetal.,2011;Soutoetal.,2012;Stuedi,2005;Tanetal.,2009;Xieetal.,2007;Zhangetal., 2011). a heterogeneous system is a system involving versatile hubs with diverse vitality supplies, distinct transmission powers, or distinct information rates (Avudainayagam et al.,2003;Liuetal.,2011;Zhang et al.,2011;Xie et al.,2007).remaining have overlooked the hub heterogeneity and concentrated on steering among heterogeneous systems each of which is included homogeneous nodes(Fujiwaraetal.,2012).some have characterized heterogeneous system of a system containing portable hubs with different interfaces (Al Aamri et al.,2010;Clausen and Jacquet, 2003; Kunz, 2008; Safaetal., 2007;Souto et al., 2012). we characterize heterogeneous MANET as a system shaped of heterogeneous hubs and a portion of the hubs may have more than one remote interfaced and the remote interfaces can be of diverse remote advances along these lines, the course are heterogeneous courses.

The Table-driven DSDV convention is a adjusted variant of the Distributed Bellman-Ford (DBF) Algorithm that was utilized effectively as a part of numerous element bundle exchanged systems. The bellman-ford strategy gave a method for ascertaining the most limited ways from source to destination hubs, if the measurements to every connection are known. DSDV utilizes this thought, yet defeats DBF's propensity to make directing circles by including a parameter called destination-grouping number. In DSDV, every hub is obliged to transmit a grouping number, which is intermittently expanded by two and transmitted alongside whatever other steering redesign messages to every single neighbouring hub. On gathering of these redesign messages, the neighbouring hubs utilize the accompanying calculation to choose whether to

overlook the overhaul or to roll out the essential improvements to its directing table.

The ad hoc on demand distance vector routing (AODV) convention is a responsive unicast steering convention for versatile impromptu systems. As a receptive steering convention, AODV just needs to keep up the directing data about the dynamic ways. In AODV, the steering data is kept up in the directing tables at all the hubs. Each portable hub keeps a next bounce steering table, which contains the destinations to which it as of now has a course. A directing table passage terminates in the event that it has not been utilized or reactivated for a pre specified close time.

On demand tree based routing protocol used to combining the levels of node by node by using the algorithm is Tree based optimized flooding. Which can be used to increase the connectivity and extending the network lifetime.

In OTRP (on demand tree based routing protocol) will process the work based on the intermediate nodes from source node to the destination node. Here the route request send to every node based on transfer the information is same as AODV protocol.

In light of system size and unidirectional connection to be discovering the heterogeneous courses from source to destination by utilizing the force mindful heterogeneous steering convention. These attributes make MANET conventional directing conventions awkward in a heterogeneous situation

III. Motivation

In mobile ad hoc network the energy consumption problems occurred like battery status of mobile nodes. Mainly in mobile nodes the Bluetooth and Wi-Fi connection formed on wireless technology and Bluetooth node consumes how much energy consumption compare to Wi-Fi connection. It overcome those problems by using to know their energy status of neighbouring nodes to transfer the data

IV. Statement of a Problem

Multi-interfaced node with low energy could continue to fall on optimal routes and such a node could offer a link between heterogeneous nodes where no other link is possible. Thus, such a node could suffer energy shortage and fade out from the network.

V. Proposed System

To integrate updated message to the proposed messages which allows a node to signal to neighboring nodes its residual energy status and enforce the modification of power cost.

VI. Problem Domain

Basically network is collection of nodes. In mobile ad hoc network is a wireless network that is

1. Infrastructure network
2. Infrastructure less network

Coming to our problem is infrastructure less network i.e Bluetooth, Wi-Fi connection are like here data traffic, power consumption problems are occur so here how much energy consumed by those are formed in infrastructure less network.

a) Mathematical model

BL=1- (data in queue list / amt in bfr)

Data in queue list is number of queued packets to be transmitted.CT = $Cost_{gat}$ + $Cost_{fwd}$.$Cost_{gat}$ is cost for gathering the channel forwarding either Bluetooth ,WI-FI $Cost_{fwd}$ is cost fowarding of a packet over a link.$Cost_{trans=}m_{size}\times a$ M_{size}message data forward in bytes. a is the cost per byte and change when WI-FI, Bluetooth.

ESB= SBE/PBE where SBE is Starting battery power of the node in joules, maintain at starting level. and PBE -present battery power at node . The battery cost of a node increases when it consumes more of its energy. The present battery power PBE changes according to the mobility of the node. In the event that the hub is unmoving, it utilizes a steady division of its vitality consistently and its PBE is redesigned whenever a point happens from unmoving to send accepting utilize clock to record the quantity of seconds the hub spent in an unmoving state. PBE=PBE-CJ × r CJ is the power used per second by an idle node r is the idle duration of a hub in seconds when a hub moves from forwarding or receiving state to another state

PBE=PBE-CT , EC=α*CT+(1-α) *ESB

Where 0≤α≤1 α -can be changed for saving battery power of hubs

b) Notations

- DD– Data delivery
- ML – Maintainance of load
- CT = Cost for the transmission
- ESB= energy storage in battery
- SBE= Initial Battery Energy
- PBE = Current Battery Energy
- EC = Energy Cost
- DD_Dest - Data delivery storage of hub on the path
- ML_Dest - Load maintainance over the hub in the path
- Conv_Dest - Conversion rate resembling all the conversions over the path
- EC_Dest - Energt rate assign the destination path
- BL_Route - balance the burden parameter held at node resembling the load present on it

- Conv_Route – Transformation expense looking like the expense of changing from starting with one innovation then onto the next
- EC_Route - Energy cost assign with the route

c) Power aware routing algorithm

Step 1: Here the node is received with same originator ip address and route request then simply discard the newly received route request.

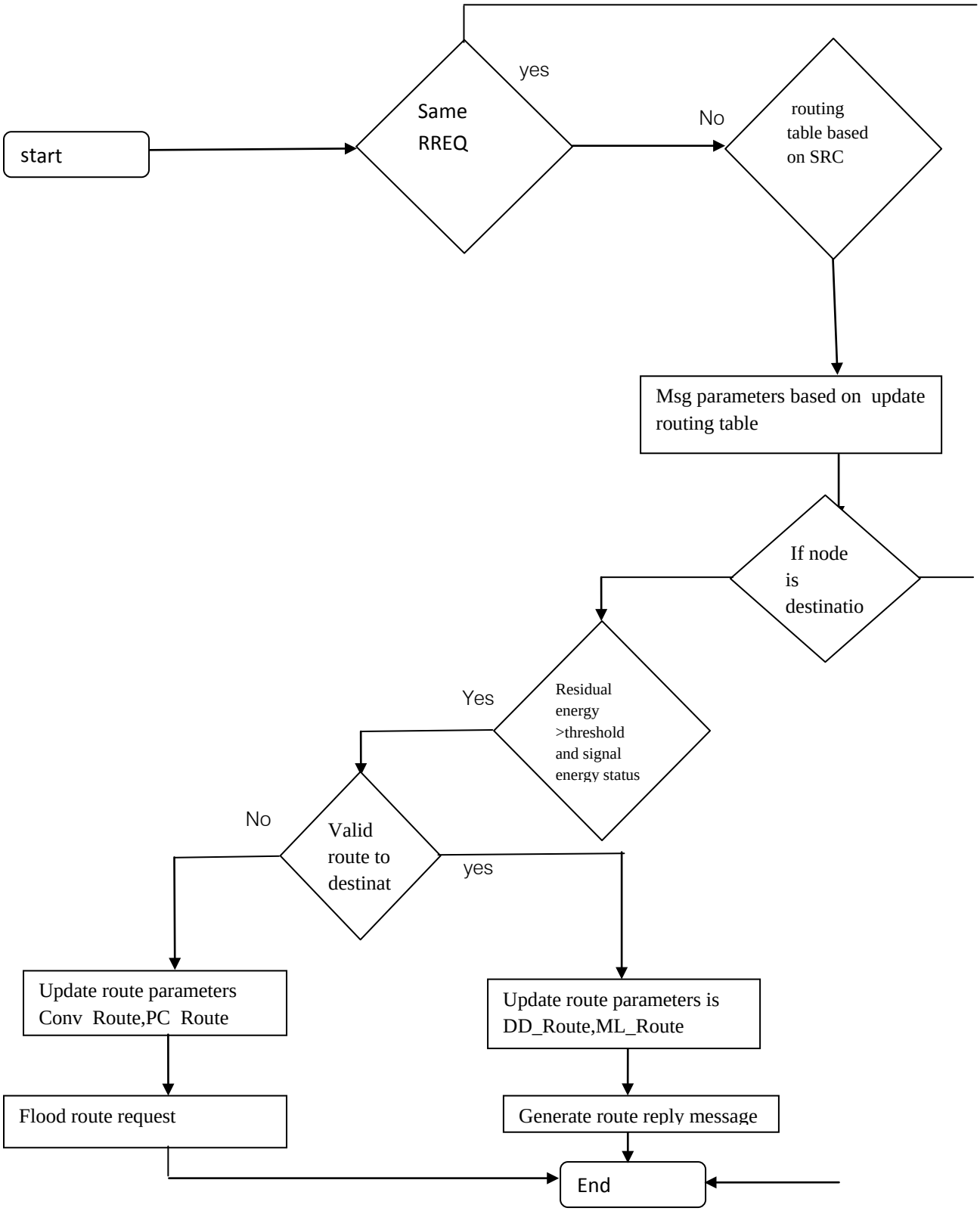

Figure : RREQ processing flow chart

Step 1.Source sends the request message to all neighbours

Step 2. Request message from same node then

Step 3. Ignore the request

Step 4. Else update the route table

Step 5. If node is a destination

Step 6. Produce route reply message

Step 7. Node >threshold level and Integrate message

Step 8. DD_Route,PC_Route, and Conv_Route and flood request

Step 9. otherwise ignore the request and update route parameters

Step 10. DD_Route+DD_Dest,PC_Route+PC_Dest

Step 11. Generate route reply message..

VII. Simulation Model

In this experiment we are setting different nodes to analyze the performance of the system. Here we consider 50 nodes, we configure the nodes with wireless network properties. Here we are implementing in the Network Simulator 2

Channel type	Wireless channel
Radio propagation model	Two ray ground
Network interface	Wireless/phy
MAC type	MAC/802_11
Interface queue type	Queue/Drop tail
Link layer type	LL
Antenna model	Omni Antenna
Number of nodes	50

VIII. Results

Figure 2 : Comparison of throughput

Figure 3 : Comparison of residual energy status

Residua energy: which allows a nodes residual energy status to signalling to the neighbouring nodes based on we can travel the messages from source to destination. The fig 3 shows the AODV,PHAODV will compare the result. AODV protocol will doing less performance compare to that of PHAODV.

IX. Analysis Results

In experimental design,let us taking 20 nodes of their residual enery status based on finding the best path from source to destination as follows. Here we are taking the available routes between source to destination of their energy based to transmit the data.

a) Input

Suppose Select the source node is:25

Suppose select the destination node is:34

b) Output

Available route;25 28 11 18 34

Average energy value of path: 74.598999

i 1=13

Avaialable route:25 35 14 32 18 34

Average energy value of path: 74.232333

Node neighbouring:14

Sorted energy:65.19899 66.19899 67.232333 68.89899 69.39899 70.39899 71.39899

Aevalue(3):75.06566

best path list:5

best path:25 48 14 32 18 34

data transmission:25 48 14 32 18 34

X. Conclusion

In these paper, the proposed approach was implemented in network simulator and its performance was compared to that of AODV, PHAODV. The performance metrics was taken into the through put, and residual energy status. By using those metrics to signal the residual energy status of neighbouring nodes based on easily transferring the messages from source to destination. The Future work resides the modification of energy cost and threshold levels depend on the node residual energy, which may decreasing error messages across the network.

References Références Referencias

1. AlAamri H, Abolhasan M, Wysocki T,Lipma J, "*optimised relay selection for route discovery in reactive routing"* Ad Hoc networking 2013;11(January).
2. AlAamri H, Abolhasan M, Wysocki T,Lipma J, "*on optimising route discovery for multi-interface and power-aware nodes in heterogeneous MANETs"* the proceeding of the sixth international conference on wireless and mobile communications(ICWMC 2010);September 2010.
3. Safa H, Artail H, karam M, Ollaic H, abdallah R.HAODV :"*a new routing protocol to support interoperability in heterogeneous MANET. In:* proceeding of the IEEE international conference on computer systems and application; may 2007.
4. Safa H, karam M, Moussa B.2013."*A novel power aware heterogeneous routing protocol for MANETs."*In: proceeding of the 27th IEEE international conference on advanced information

networking and application (ANIA-2013);Barcelona Spain; Marh 2013.
5. Safa H, Artail H, Shibli R." an interoperability model for supporting reliability and power-efficient routing in MANETs" Ad Hoc Ubiquitous computing 2009.

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Dual-Region Reputation based Resource Management in Mobile Ad Hoc Networks

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Abstract- A mobile ad hoc network (MANET) is a kind of wireless ad hoc network. It is a self-configuring network of mobile routers connected by wireless links. Since MANETs do not have a fixed infrastructure, it is a challenge to manage both mobility as well as resource utilizations for Ad hoc networks. In this paper, I propose a Reputation management scheme, called reputation factor (RF) effective resource selection using the reputation based approaches for node selection. The developed resource allocation algorithm is based on different parameters like time, cost, number of processor request etc. The developed priority algorithm is used for a better resource allocation of jobs in the network environment used for the simulation of different models or jobs in an efficient way. After the efficient resource allocation of various jobs, an evaluation is being carried out which illustrates the better performance. Performance is evaluated by using simulation.

GJCST-E Classification : C.2.2 C.2.3

Strictly as per the compliance and regulations of:

Dual-Region Reputation based Resource Management in Mobile Ad Hoc Networks

K.Surendra[α] K.Delhi Babu[σ]

Abstract- A mobile ad hoc network (MANET) is a kind of wireless ad hoc network. It is a self-configuring network of mobile routers connected by wireless links. Since MANETs do not have a fixed infrastructure, it is a challenge to manage both mobility as well as resource utilizations for Ad hoc networks. In this paper, I propose a Reputation management scheme, called reputation factor (RF) effective resource selection using the reputation based approaches for node selection. The developed resource allocation algorithm is based on different parameters like time, cost, number of processor request etc. The developed priority algorithm is used for a better resource allocation of jobs in the network environment used for the simulation of different models or jobs in an efficient way. After the efficient resource allocation of various jobs, an evaluation is being carried out which illustrates the better performance. Performance is evaluated by using simulation.

I. Introduction & Background

We can described the life cycle of mobile ad hoc network into the first ,second and third generations. Present adhoc network are viewed as the third generation. The original ad hoc network can be followed back to 1970's. In 1970's, these are called Packet Radio Network (PRNET). The Defense Advanced Research Project Agency started examination of utilizing parcel changed radio correspondence to give solid correspondence in the middle of PCs and urbanized PRNET. Essentially PRNET utilizes the blend of Areal Location of Hazardous Atmospheres and Carrier Sense Multiple Access for various get to and separation vector directing.

To dynamically identify the optimal selection of Reputation values per mobile node based on the following:

1. Minimize the network cost based on resource management.
2. By using Reputation based approaches.
3. RF combines the strength of grid based location management and pointer forwarding strategy to achieve high scalability and low signaling cost.
4. The communication module acts as an interface for the RMS to communicate to neighbors RMS. The main purpose of this module is to exchange reputations with immediate neighbors through three types of messages:
   1. *REP REQ Message:* This message is sent to neighbors in order to ask for RF values for nodes whose states have changed to suspected. Upon receiving REP REQ, the communication module asks the reputation manager to return the RF values of nodes in REP REQ
   2. *REP REP Message:* When the communication module receives the returned RF values from the reputation manager, it constructs the REP REP message and sends it back to the requestor node. Upon receiving the REP REP, the communication module forwards the received RF values to the reputation manager.
   3. *ALARM Message:* This message is sent to neighbors when there is a node whose state is changed. Upon receiving ALARM, the communication module forwards the received RF values to the reputation manager.scratch pad, and so on. In the interim the Development of Standard IEEE 802.11 (i.e. WLAN's) profited the ad hoc network. Some different principles are likewise built up that give advantages to the MANET like Bluetooth and HIPERLAN.

II. Related Work

- We assume that every mobile node has knowledge about the global partitioning as well as the hash function such that it is able to locate the center of the home region of any node. All mobile nodes within the home region of a mobile node serve as home region location servers for that node. DrMoM varies the home region size dynamically based on the mobile node's runtime mobility and service characteristics.
- The home region size can be expanded as needed to ensure that at least one node exists to serve as the location server. We assume that node distribution (e.g., random or city-style) is a predefined knowledge known to every node, so every node knows how far Rh should be in order to cover at least one node from the center of its home region. Besides the home region, each mobile node is also associated with a local region, and it exchanges location information with neighbors in the local region. Unlike the home region, which

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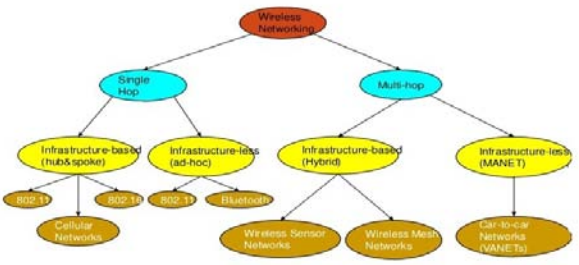
does not move, the local region moves with the mobile node.

- The home region keeps location summary information of the node, i.e., the coordinate of the center and radius of the node's local region. Whenever the local region moves due to movement of the node, the location servers in the home region are updated with the location summary information.
- To locate the local region of a destination node, the source node sends a location query to the destination node's location servers.The coordinates of the center of a home region is statically determined, whereas the radius is dynamically determined on a per-node basis, depending on the node's mobility and service characteristics. The home region size, determined by its radius denoted by Rh, is a key factor balancing the tradeoff between the overhead for location queries/updates and the robustness of the location service.
- Specifically, a larger home region covers more location servers on average and consequently increases the chance of a successful location query. However, a larger home region also leads to larger overhead for location queries and updates. Because Rh is dynamic, the size of the home region is dynamic and not necessarily restricted by the size of the rectangular region.

a) Taxonomy of Wireless Ad hoc Networks



In a MANET, mobile hubs shape an always showing signs of change topology. The configuration of effective and adaptable directing conventions is consequently a basic test. Two sorts of ad-hoc steering conventions have been proposed: topology-based and position-based (or geographic based). The topology-based steering conventions utilization message broadcasting to develop courses coordinated to every hub. In addition, every hub additionally keeps up a directing table to record courses to alternate hubs in the network. These conventions intensely depend on finding and keeping up virtual connection states, yet they additionally include some potential issues.

One of the issues comes from the breakage of the connections on a course where hubs move. Another issue would be the high activity overhead. Rather than topology-based steering conventions, position-based directing conventions are broadly considered as a possibly adaptable steering arrangement since they don't have to keep up steering tables. These conventions use location data of neighboring hubs and destination hub to settle on their sending choices with geographic sending calculations. One of the downsides of the position-construct conventions is their reliance in light of additional situating gadgets, for example, GPS (Global Positioning System) for securing location in-development. These situating gadgets for the most part lead to additional cost and force utilization. Yet, mobile gadgets with situating capacity are getting prevalent as of late because of the wealth of location-based applications. Case in point, situating gadgets have been generally conveyed in different hubs.

b) Worldwide Mobile Information System(GloMo)

- The objective of the undertaking is to make the mobile environment a five star native in the Defense Information Infrastructure by giving easy to use integration and access to administrations for remote mobile clients.
- Self arranging/self mending networks; both level and various leveledmultihop steering calculations like ATM networks over remote.
- Georouting; Satellite interchanges networks; heterogeneous networking with IP overlays; end-to-end network improvements; and security & survivability for ad-hoc networks.
- Wide-Area Information Systems, Information Systems for Dismounted Forces, and Information System for Rapid Deployment of Forces.
- The NTDR framework is a DA-coordinated, test, mobile parcel information radio network that connections Tactical Operations Centers in a brigade area.
- The NTDR gives a self-arranging, self-recuperating, network capacity. Radio network administration is given by a Network Management Terminal.
- The main role of the NTDR is to give information transport to the Army Battle Command System robotized frameworks to units at brigade and beneath
- Lessons gained from this test handling give a bit of the specialized gauge for radios being intended

III. Proposed Work

To diminish the general network activity caused by mobility administration and parcel conveyance herewith we propose proficient mobility administration.

- The proposed plans to oversee both mobility and in addition asset uses for Ad hoc networks.

- For ideal home area size and nearby locale size (characterized by their particular radii meant by Rh and Rl) for every mobile hub in light of the mobile hub's runtime mobility and administration qualities to minimize the general network expense caused for location administration and information parcel conveyance.
- To rapidly distinguish the ideal determination of Reputation qualities every mobile hub taking into account the accompanying:
- Minimize the network expense taking into account asset administration.
- By utilizing Reputation based methodologies.
- RF joins the quality of framework based location administration and pointer sending system to accomplish high versatility and low flagging expense.
- Simulation utilizing NS2.

Mobility in remote networks can take diverse structures ,, for example,

Terminal mobility: the capacity for a client terminal to keep on getting to the network when the terminal moves;

a) Client mobility

The capacity for a client to keep on getting to network administrations from distinctive terminals under the same client personality when the client moves.

b) Administration mobility

The capacity for a client to get to the same administrations paying little respect to where the client is.

In addition, a terminal or a client may be considered by a network to have "moved" regardless of the possibility that the terminal or the client has not transformed its physical location. This may happen when the terminal changed its association starting with one kind of remote network then onto the next, e.g., from Mobility administration is the essential innovation to empower the consistent access to cutting edge remote networks and mobile administrations.

Future IP-based remote networks, for example, a wide range of media administrations including ongoing administrations, for example, voice and feature gushing and also non-continuous administrations, for example, email, web-perusing, and FTP. Fundamental necessities of mobility administration in cutting edge.remote networks ought to include: first and foremost, the backing of all types of mobility; second, the backing of mobility for both constant and non-ongoing applications; third, the backing of clients consistently moving crosswise over heterogeneous remote networks in the same or diverse administrative areas.

Fourth, the backing of an on-set client application session to proceed without noteworthy interferences as the client moves. This session congruity ought to be kept up when a client changes its network connection focuses or moves starting with one sort of remote network then onto the next; and last, the backing of worldwide wandering, i.e., the capacity for a client to move into and use distinctive administrators' networks of home areas.

c) Location administration

A procedure that empowers the framework to focus a mobile gadget's present location, i.e., the present network connection point where the mobile gadget can get activity from the framework.

d) Handoff administration

A procedure that empowers a mobile gadget to change itsnetwork connection point while keeping its on-going activity continuous. In the event that the network connection point change includes the meandering into another network with an alternate administrator, then network access control is likewise included in the handoff process. Network access control incorporates confirmation (check the character of a client), approval (figure out if a client ought to utilize the network administration), and bookkeeping (gather data on the assets utilized by a client).

The framework model exhibited in this paper is in light of the taking after presumptions.
Every hub has an interesting id and it can't be parodied.

- The network is sufficiently thick so that every hub has at least two one-bounce neighbors.
- A remote interface of every hub underpins indiscriminate mode operation: a hub dependably listens to each transmission within its one-jump neighborhood despite the fact that it doesn't involve in those transmissions.
- Links are bidirectional. At time t, if hub B can get a message from hub A, hub An ought to have the capacity to get a message from hub B at time t too.
- A radio wire utilized on every hub is an omni-directional antenna which empowers its transmission to be observed by its one-jump neighbors.
- Each hub is free from one another, no conspiracy.
- We don't consider pernicious hubs, just egotistical hubs seeking to moderate their own asset.
- Flood to get a hub's location.
- Excessive flooding messages
- Central static location server.
- Not blame tolerant
- Too much load on focal server and close-by hubs
- The server may be far away/ parceled
- Every hub goes about as server for a couple of others.
- Good for spreading load and enduring disappointments.

- Limited assets and physical security.
- Intrinsic common trust helpless against assaults.
- Lack of approval offices.

e) Solution Strategy

The Reputation of the node can be calculated based on below assumptions:

i. The time used to send the packet to their adjacent nodes and
ii. The number of processor requests it attains

The equation to find the neighbors based on the above two parameters is :

Reputation Factor (RF) for individual node =(min-time , max-processing power)

$$\text{i.e., } RF = T_{min} \& RF = P_{max}$$

f) Algorithm

Processing a ReputationFactor

i. select one cluster /** selection of one grid
ii. selectsrc,des, neighbours /** identify source, neighbours, destination
iii. source(S) ->Rreq (msg) /** sender sends RReq to all its neighbours
iv. S - >Adj-node -> Rec (msg) /** source node receives all of it's neighbour concerned factors
v. S - >cal (RF) /** calculation of RF values
vi. RF - $>T_{min,}$ RF - $>P_{max}$/** cross-checking all the values
vii. S ->discovered (neighbour) /** now source node select this adj node
viii. S ->D /** now source sends alerts to destination via selected adj node

g) Implementation Performance

Let us consider the 5 nodes

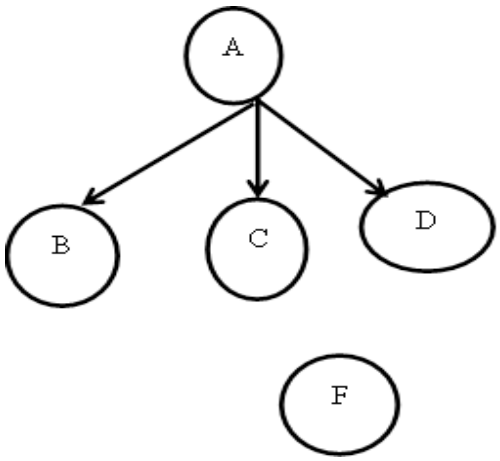


Fig. Node A needs to find Adj Node using Reputation Factor to communicate with Node F

Source node A - > F (Destination node)
Adjacent nodes = B,C,D

Table 1 : Validation with RF

Inputs	Node-B	Node-C	Node-D
Min-Time	10ms	12ms	5ms
Max-Proc. Power	100w	120w	130w

Intermediate Process : cross-checking based on conditions

Output : Node D

The Process now processed as follows :

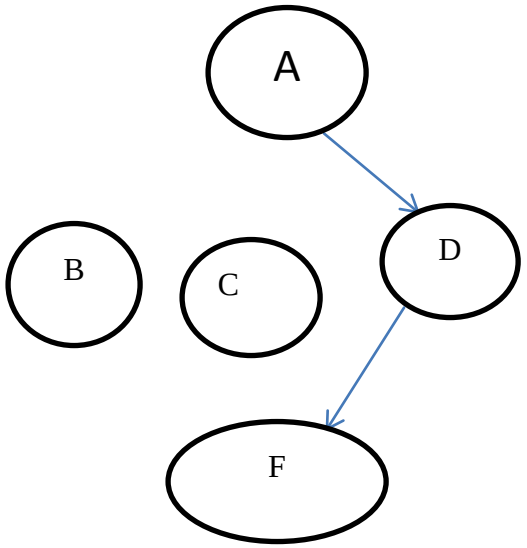


Fig. b : Node A establishes path to Node F via Adj node D

- Let us assume the total number of nodes = 1000
- i.e., node1,node2,node3,node4,……node99,node100.
- Suppose the 'node 1' contains '5 neighbours' it is easy to find RF
- If 'node 35' contains '100 neighbours ' is very hard to resolve RF
- Finally, the Reputation Factor (RF) for individual node = (min-time , max-processing power)

$$\text{i.e., } RF = T_{min} \& RF = P_{max}$$

Where the T_{min} indicates the minimum-time parameter & P_{max} indicates the maximum-Processing Power parameter

i. *Case Studies*

Table 2 : Process Flow using RF

Inputs	Intermediate Process	Outputs
15-nodes	RF_{h10}	Adj node can be easily identified
20-nodes	RF_{h20}	Adj node identification is slightly hard
40-nodes	RF_{h40}	Hard to resolve
80-nodes	RF_{h80}	Very Hard to find Reputation factor

Where the indication of hardness level is h80>>h40>>h20>>h10

ii. *Performance Evaluation*

The below graph compares the Dual-Region mobility management and Reputation Management System.

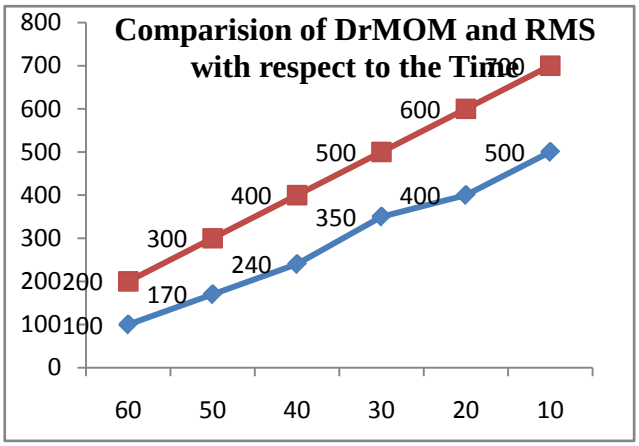


Fig. : Comparision of DrMOM and RMS with respect to the Time

The x axis represents the Parameter Min Time and the y-axis represents the cost in terms of no. of nodes.

Similarly, The below figure shows the comparision of DrMOMand RMS with respect to the power.

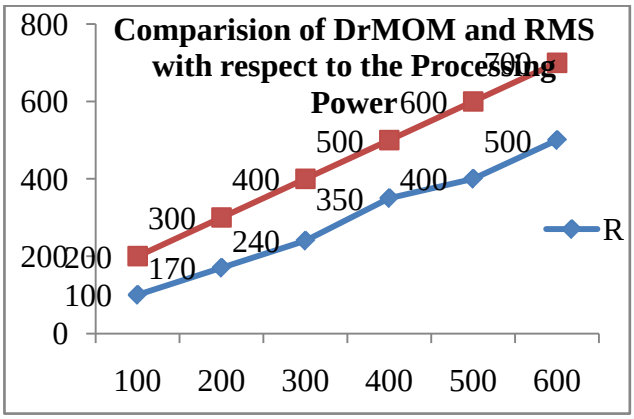


Fig. Comparision of Dr MOM and RMS with respect to the Processing Power

The evaluation is measured in terms of cost factor i.e, based on max-power and number of nodes, the comparision is takes place.

IV. Conclusion

A Reputation-based system as an extension to the existing resource management for detecting the neighbour nodes in mobile ad-hoc networks. The proposed system is evaluated by implementing it on ns2 Simulator.Although they could save their resources by not forwarding packets for others, their packets would not be delivered as well. some simulation results are provided to validate work and show its performance.

And also the evaluation of proposed system is expressed in the presence of nodes who forward only the necessary amount of packets so that they are not detected as malicious. This means that they try to keep their reputation in between the two thresholds which was categorized as suspicious nodes. To refer to this type of nodes, we use the term “partially cooperative”.

References Références Referencias

1. A.R. Chen, T. Chen, C. Lee, Agent-based forwarding strategies for reducing location management cost in mobile networks, ACM Mobile Netw. Appl. 6 (2) (2001) 105– 15.
2. C. Hsu, S. Wu, An efficient cost based location service protocol for vehicular ad hoc networks, in: IEEE international Conference on Communication, Networks and Satellite, July 2012, pp. 93–97.
3. H. Saleet, O. Basir, R. Langar, R. Boutaba, Region-based location service management protocol for VANETs, IEEE Trans. Veh. Technol.59 (2) (2010) 17– 931.
4. [22] Y. Michiardi and R. Molva, “Core: A Collaborative Reputation mechanism to enforce node cooperation in Mobile Ad Hoc Networks,” Communication and Multimedia Security Conference, September 2002.
5. Y. Bansal and M. Baker, “Observation-based Cooperation Enforcement in Ad hoc Networks,” Research Report cs.NI/0307012, Stanford University, 2003.
6. Z. He, D. Wu, and P. Khosla, “SORI: A Secure and Objective Reputation-based Incentive Scheme for Ad-hoc Networks,” Proceedings of WCNC 2004, Atlanta, GA, March 2004.

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We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSC can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSC, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.

The FARSC will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSC member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A. Once you are designated as FARSC, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

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The FARSC member also entitled to get the benefits of free research podcasting of their research documents through video clips. We can also streamline your conference videos and display your slides/ online slides and online research video clips at reasonable charges, on request.

The FARSC is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSC can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSC member can decide its price and we can help in making the right decision.

The FARSC member is eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get remuneration of 15% of author fees, taken from the author of a respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN COMPUTING (MARSC)

The ' MARSC ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.
The “MARSC” is a dignified ornament which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., MARSC or William Walldroff, M.S., MARSC.

MARSC accrediting is an honor. It authenticates your research activities. After becoming MARSC, you can add 'MARSC' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

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MARSC designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSC, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSC member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSC, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

AUXILIARY MEMBERSHIPS

Institutional Fellow of Open Association of Research Society (USA)-OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

Other:

The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

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Page Size: 8.27" X 11'"

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- Font type of all text should be Swis 721 Lt BT.
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- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
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- Two Column with Equal Column with of 3.38 and Gaping of .2
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- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
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You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

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The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

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3. SUBMISSION OF MANUSCRIPTS

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Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications.

Research letters: The letters are small and concise comments on previously published matters.

5. STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

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Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

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Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

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Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

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The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

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Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

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You must strictly follow above Author Guidelines before submitting your paper or else we will not at all be responsible for any corrections in future in any of the way.

Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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