

QOS ANALYSIS OF WIRELESS NETWORKS BASED ON LOW MOBILITY PROTOCOL

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Abstract The decision on the possible trails to be taken by an information that is to be transmitted from a data point to its destined point enact to have more significance on the performance measure of the transmission. The mobile wireless network is also one such network whose quality of service are determined from the ways the trails are entrenched. This wireless adhoc network that is independent of the previously existing structure forms a topology that undergoes spontaneous changes with the closely existing data points or devices. This type of networks are well suited for many adverse situation and environment, but certain attributes of the wireless adhoc such as insubstantial bandwidth, more over head in paths, hidden data point problem, energy restraints, motility interfered routing make them visage difficulties in having a proper routing, empowering MANET to achieve lesser quality in the service provided. So this paper quality of service analysis for the MANET using high power low mobility protocol ensures a routing path entrenchment between highly energetic with diminished motility data points to improvise the quality of service. The QoS analysis is done based on the delay, throughput and the packet delivery ratio to measure its performance.

Keywords: Mobile Adhoc Networks, Quality of Service, mobility, delay, throughput, packet delivery ratio,

1. Introduction

The word Adhoc means for this. That is it is patterned for a précised chore and cannot be generalized and would not be considered to attune to other intentions. In networking it is expressed as network systems that are put together to shape a network that entails little or not much planning. It could be else way termed as a handcrafted system of network. Adhoc wireless network is one such handicraft which institutes and sculpts itself on its own by the collection of different data points put together. It could be more plainly quoted as a structure or base less wireless network which is dissimilar to wireless networks with base station and access points. The adhoc wireless network can be contrived using the instantaneously available devices. Any electronic gadget either a mobile phone or a laptop or a tablet could enact as a data point and sets up communication and form topology when they are at reach. The data points that are grouped to form a topology does not remain permanently as the data point are motile by nature causing impulsive and swift changes in the frame work. Due to the lack of structure in the wireless adhoc network the communication form one point to the other is handled by the intermediate data points, so for the

transmission to be done between two points that are not at a visible range with each other, the endorsement of the particulars would be imparted with the help of the data points existing in between by multiple hops, so the structure is also known as a multi hop wireless network. So the data points in the arrangement take up the twofold task of either the information initiation or information dissemination. Depending on the structure and the way it is distributed it is categorized as homogenous and heterogeneous network. The homogenous are the devices of same attributes, for instance that is all data point used might be cellphones. Whereas the heterogeneous accepts devices with varying attributes where one data point would be a cellphone other would be a laptop and other would be a personal computer with internet connection in it. The operation of these networks are either performed isolated or in a detachable manner. These adhoc wireless network which are the incomer of the previously existed packet radio network handled data transmission in half duplex mode initially, but certain entitled methodologies gives initiative to the wireless adhoc network to have a full duplex communication. These entitled technologies that empower Adhoc are zigbee that follows the standard of IEEE802.15.4, Bluetooth which basically confirms to standard IEEE802.15.1, standards such as IEEE802.11 and IEEE802.16 where the usage of IEEE802.11 are very common in the Adhoc's. Though these standards have certain performance limitations they can be improvised using the currently trending technologies such as directional antenna and MIMO technologies. The transmission through these technologies take place with the help of single hop and the transmission with multiple hop is enabled by the structure based on the open system interconnection and transmission control protocol /internet protocol. The mobile adhoc network is a type of wireless adhoc network where few mobile devices are banded together without wires. These are heterogeneous structures that come with the capabilities to pattern, rejuvenate and upgrade on its own. For any form of network the process by which the transmission is undertaken is called routing. Routing decides the trail for the information to be passed from one point to the desired point. The routing of the system enables to adjudge the performance of the systems. On acquiring the requisition for trailing information the routing enables to decide the most adept path with all required reserves to provide a qualitative routing. Such routing protocols in MANET can be classified as proactive and reactive and combination of both in a hierarchical structure. Where proactive are table driven in which each data point has the thorough amend of the entire topology so this looks like already established path and can be used when necessary by determining the best trail. The reactive involves in instituting a trail whenever a situation necessitates it to, and the hybrid are the merging of reactive and proactive. Though routing strategies are obtainable in adhoc wireless network, their dispersed nature lack of central systematization, changing topologies caused by mobile data point, insubstantial amount of resources and their lossy nature makes routing achievement in MANET to be very tedious. So it becomes essential to devise a routing capable of enduring the challenges in the adhoc wireless network to afford a quality in service.

The proposed paper devises a routing protocol to have a trail entrenchment between the data points that are highly energetic having diminished motility (HEDM) to provide with mobile adhoc network with less losses and boosted quality of service on the grounds of delay, throughput and packet delivery ratio.

The organization of the paper proceeds as 2 related works 3 proposed work 4 result analysis 5 conclusion

2. Related works

Giallorenzi et.al [1] the transmission proceedings in a mobile ad-hoc wireless network, where the communication is coded and sent to the node which is allotted with a specified frequency band to transmit and receive by the node of same frequency. This is done through a direct sequence spread spectrum modulation based on code division multiplexing access and frequency division multiplexing access. Gupta et.al [2] gives the step in elimination of black holes using the ad-hoc on demand distance vector routing and eludes the malice data points that sends fake request reply and drops the information intended to forward turning out the system to be reliable. Garikipati et.al [3] the distribution modelled using clustering that involves the distribution uphold with a key and the cluster formation performed involving a diagnosis of fault to provide with a better secure transmission Malhotra et.al [4] levels of security in wireless ad-hoc network remains low and measures to set up remains as a tedious work due to the absence of control nodes and routers. So a secure routing is done by share two keys one for authenticating avoiding overhead in data points and other for the initiation of authenticating key to elude the snooping in the devices. Trivedi et.al [5] the optimum value assignment using swarm optimization procedure for the parameters of the adhoc distance vector routing protocol to improvise the quality of service in wireless adhoc network gaining low mobility. Sharma et.al [6] the urge to have a high performance routing protocol by comparing the available protocols considering the number of connected devices and number of communications and number of pauses. Sharma et.al [7] the mobile adhoc wireless network traffic is controlled using the drop tail algorithm and random early detect algorithm comes to conclusion conducting the performance analyses that depending on the parameters of the network their performance might vary and the traffic controlling protocol enables to have an improvised performance. Jahir et.al [8] the mobile adhoc network offering an transient set up of communication until the conventional set up is established ensure a minimization in overhead, improvement in the delay with diminished energy consumption in area where the changes in topology and the mobility are high. Ünlü et.al [9] the initiation of the scheduled base distribution to control the communication enables to have a disruption less transmission that stretches assist to the mobility and shrink in power consumption. Goswami et.al [10] the parametric values the quality of service of all the routing protocols used in the wireless adhoc network is analyzed on the Anova tool for correctness endorsement. Prashar et.al [11] the wireless adhoc network makes it susceptible to attacks so the adhoc network subjected under various attack is listed with the methods to overcome it. Mohandas et.al [12] the virtualization in the clusters formation with a proper selection of cryptography in the correlated swift and dynamic mode offers a highly secure communication and power consumption within limits.

3. Proposed Work

MANET habitually known as Mobile adhoc network or wireless adhoc network is also termed as on-the- -fly network as it is network contrived with instantaneously available devices without a frame work independent of the hitherto existing systems. This allows trailing of information from one point to other point that is within the transmission range without an intermediary. For the destined data point which is under the visible range of the origination point receives the information directly. When the destined data point is out of sight of the origin point then it starts to endeavor the help from its nearby data points to send forth the information to the destined point. As the number of instantaneously added device increases, so the trails to reach the terminal keeps on increasing, it is when the requirement for the routing arises. The routing takes up the role of decision making to decide with best suited path for the conveyance equipped with all resources. As the mobile adhoc networks are structured without a base station or an access point the traditional routing methodologies becomes inconvenient as the traversing in wireless adhoc is done by taking hops. Suspension or the delaying in the wireless adhoc network occurs due to the motility of the intermediary nodes in the trail or because of the motility of the end data points causing trail breaks during traversing. So the routing protocol for wireless adhoc networks must be acquired with more efficiency in performance and potent motility management.

The paper proposes a valorous pattern of finding a path between the source and destination to entrench a steady and secure trail withstanding the mobile nature of the data points, causing a diminished routing overhead. The entrenching of the path starts with the enquire into the network by the routing to find the highly potent data point. The commencing of the search begins from the source data point with focus on finding the data points having negligible chances of failure. That is the data point that are provided with maximum swiftness and diminished motility. This is proceeded by traversing across the complete set of data point near to the start point and proceeding further to find the most potential data point. The trail entrenchment is widened with the scope to track a cost of data point based on transmit time (T_T) and power necessary for transmission (P_T). Each stride proceeds to find the highly potent data point tossing out the nodes that does not meet out the criteria. The proceedings commences with the exploration for nearby nodes, dropping the nodes that does not meet out the criteria, entrenching a route with negligible failures to achieve a more stable path.

3.1 Exploration for the proximate nodes

Every time there is a necessary to convey a particulars from one end to its destined end a path is paved between the two ends. The two ends which are under a same horizon does not entail it but this takes a significant place only when the two end point are out of horizon. So this necessitates for the route entrenchment to be involved to have an

efficacious communication. The initiation for the route entrenchment begins with the exploration of nearby nodes by dispersing the hailing messages accompanied by a particulars regarding the start and the end point checking for the availability of the data points the data points on receiving the hailing retaliates back with a reply message with complete particulars regarding its transmission time and transmission power contained in it. The reply message is now enumerated to have the eligible data points added to the proximate data point maintenance table (PDMT). That gathers all the eligible data points discarding the others.

The qualified data points are determined using the verge set up for energy level (V_L), where the verge level could not be below one fifth of the initial energy (E_i) of the data points. The enumerated transmission time and the transmission power can be together given as the energy level required for transmission (EL_T). As given in equation (1)

$$EL_T = E_i - (T_T * P_T) \quad (1)$$

Considering a set of mobile data points (MDP), where $MDP = \{m_1, m_2 \dots m_n\}$, in this any data points can be source data point (SDP) and as well as a forwarder which are intermediary or nearby data points (NDP) and the data point to which the information is to conveyed is the destination the exploration for the entrenching a path starts as shown in the algorithm (1)

```
Exploration of proximity node
begin
SDP hailing inquiry propagation
SDP hailing inquiry dispersion
    If (nearby data point endures) then
    begin
    NDP retaliates response
    SDP accepts response
    enumerates energy level
        If ( $EL_T > V_L$ ) then
        begin
        update PDMT
        else
        drop the data points
        end
    end
end
```

Algorithm 1.Exploration of Proximity Nodes

The data point that are sort out in the proximate data point maintenance table conserve an energy level that is not below the verge causing to have the more potent data point in the record based on the algorithm (1) that explores for the proximity nodes.

3.2 Routing Entrenchment

```
The route entrenchment
Initiate route requesting
Disperse route requesting
NDP receives route requesting
  If (NDP already received route requesting) then
  begin
  drop requesting
  end
  If (NDP has not spotted route requesting but its details are contained in it) then
  begin
  drop requesting
  end
  If (NDP contains no detail of destination) then
  begin
  forward route requesting
  end
  If (NDP is the destined end or contains route for the destined end) then
  begin
  retaliates route response
  SDP receives response
  energy level enumerated
  If (NDP eligible)
  begin
  possible routes recorded
  end
  end
end
```

Algorithm 2 Route Entrenchment

The exponential growth in the number of data points in the wireless adhoc network empowers multiple paths between two nodes that need to communicate and also extends communication with nodes that are beyond the horizon such possibilities entails the network to have a route laid between the two nodes using the intermediary nodes as forwarders to reach destination. The route entrenchment starts with the conveying of route requesting with

the details of the starting and ending point in the traversed information. The dispersing of the route requesting to nearby data point entails the proximate data points to examine in the proximate data point maintenance table checking for the particulars of the other end that is to be reached on acquiring no particulars about the data point to be reached this particular data point acts as forwarder and forwards it to the next data point. This is done until the proper end point is reached or the data point that has the particulars regarding the destination is reached either the data point with the particulars of how to reach the destination or the destination itself retaliates back with a routing response with the particulars to ensure the eligibility of the node acting as intermediary data points contained in it. The possible route that can be entrenched for the information to be conveyed is recorded to proceed further with the transmission.

The route entrenchment is done based on the above algorithm (2) to achieve a route enriched with highly potent data points where the failure of the path would be low.

3.3 Routing Perpetuation

The wireless adhoc networks is a heterogeneous network that patterns, rejuvenates, upgrades on its own is also liable of spontaneous changes in the topological structure due the motility of the instantaneous devices connected without wires. So this also remains as a reason for the failures in the transmission affecting the throughput, causing delay due to the refurbishing of the routes and affecting the packet delivery ratio. The necessity to have delay less transmission with the enhanced throughput paves way to have a transmission established with the data point with reduced motility. So NDP eligibility is determined based on the motility of the data points. The enumeration to have the eligible data points compare for the motility of the data point (M_{DP}) to be not greater than the verge level (V_{ML}) set which is not less than thirty percentage of the motility rate. So the entrenched route for traversing would have data point with low motility reducing the rate of changes in the topological structure causing the route entrenched to be stable

```
Route perpetuation
SDP receives response
Peruse possible routes
Analyses the hops taken
  If (NDP eligible) then
    begin
      If ( $M_{DP} < V_{ML}$ ) then
        selects NDP
      else
        drops NDP
      next NDP
    end
  end
```

Algorithm 3 Route Perpetuation

The routing perpetuation is done using the route perpetuation algorithm to have a highly potent route to be established. The conveying of information that initially started with the search for the proximity nodes satisfying the criteria and proceeded with the possible route that can be taken checking for the motility of data points to have enriched stability route to be entrenched and finally selects the optimized route with low motility data points to have uninterrupted data transmission that shows an enhanced throughput achievement and diminished delay.

4. Result Analysis

The proposed methodology is simulated using the network simulator with the mobile data points being arbitrarily placed within an area of 1000*1000 meters with total number of 10 to 200 data points involved in the transmission. The initial energy for transmission is set to 200 joules and the conveying takes place within the range of 200m having the speed of data point to be 2ms with the proposed methodology using the data points with heightened energy and diminished motility. The behavior of the proposed method is encountered and compared with the existing methods on the account of the throughput attained, delay acquired and the packet delivery ratio.

a) Throughput

The measure of performance of the proposed achieving a higher channel efficiency is evaluated by analyzing the maximum number of delivery that were successful. The throughput gives the maximum successful conveyance achieved in the time given as in equation (2)

$$\text{maximum delivery} / \text{time} \quad (2)$$

$$\text{Throughput} = \frac{\text{number of successful}}{\text{time given}}$$

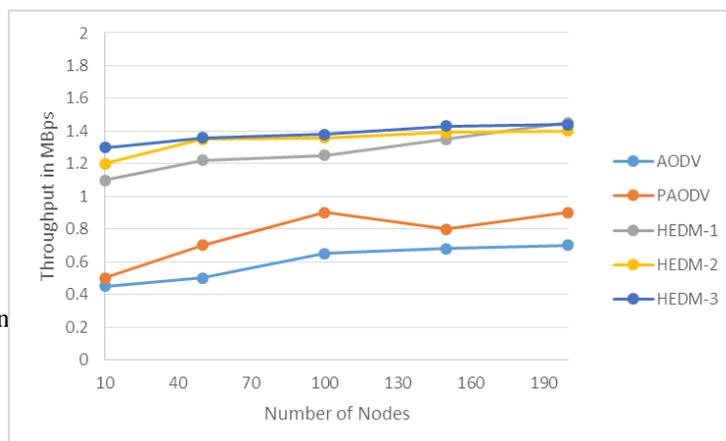


FIG 1 Throughput

The perusal on the performance measure of the proposed in FIG 1 gives the maximum number delivered with the density variation on the data points from ten to two hundred and shows maximized improvisation in the throughput gained by the proposed compared to the existing methodologies. This enables to have a higher channel efficiency and diminished losses in the transmission. The complete repetition of process is done with different value set up also ends up with an improved throughput in comparison to the other exiting methods.

b) Delay

The proposed algorithm is evaluated to get know the time taken for the completion of the proceedings in the transmission with different sets of value with the number of nodes varying from ten to two hundred and compared with the existing methods. This shows the proposed interruption less transmission achieved as the result of perpetual routing, entrenching a permanent routing using the data points of diminished motility and high energy. This causes a non-breaking transmission acquiring a low delay compared to the previously existing methods.

The delay gives the total time taken to complete the traversing for the given number of data's to be sent.is shown in equation (3)

$$\text{Delay} = \text{Time taken to complete traversing} / \text{number of packets given} \quad (3)$$

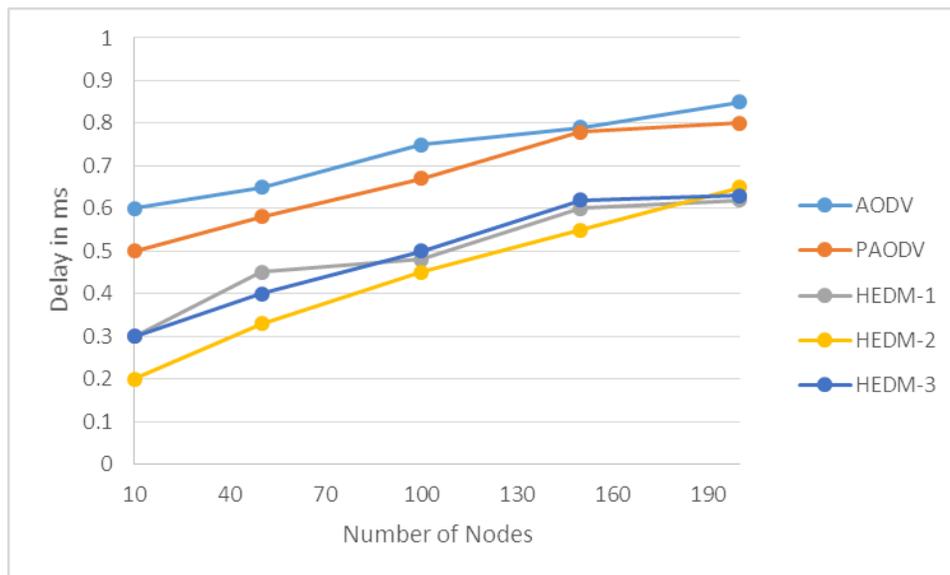


FIG 2 Delay

This FIG 2 gives the delay calculation for the proposed and it is comparison with the existing methods. This shows the maximum delay attained by the proposed is very low when compared to the delay caused by the existing resulting in low network traffic causing decrease in the latency.

c) Packet Delivery Ratio

The potential of the proposed methodology is evaluated further to get a better understanding on the basis of packet delivery ratio. It gives the number of units of data delivered in the destination for the number of units of data issued by the source as shown in equation (4)

$$\text{Packet Delivery Ratio} = \text{number of data delivered} / \text{number of data issued} \quad (4)$$

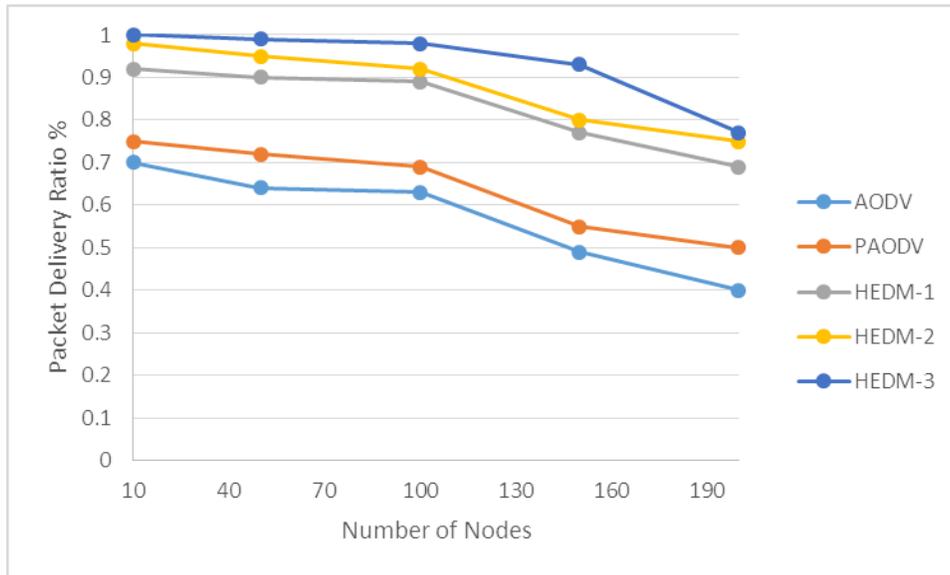


FIG 3 Packet Delivery Ratio

The graph on packet delivery ratio versus the number of nodes shown in the FIG 3 shows the maximum number of data's delivered to the number of data propagated of the proposed. The comparison of the proposed with the existing shows the difference in the height of packet delivery ratio achieved. It shows the proposed method offering a heightened packet delivery ratio compared to the existing method of routing. The continuous conveying of the proposed algorithm acquired by the usage of route comprised with the less motile data points is accredited with the improvisation in the packet delivery ratio turning out to be efficient proposal.

5 Conclusion

The instantaneous increase in the number of wirelessly communicating devices and the unique characteristics of the mobile or wireless adhoc network have made them more significant and explosive in our day to day life. Wireless adhoc networks renders the service of information sharing ignoring their topographical position. These group of data points connected together without wires under mutual trust that is inbuilt are employed in various applications such a military, calamity reassurance operations and even more. The proposed method of routing engaged with the wireless adhoc network ensures a stable routing to be entrenched avoiding the suspension of the conveyancing caused due to the breaking up of route due to their motile nature. The proposed algorithm construct the route with less motile with improved energy level data point to give an uninterrupted transmission and is then compared with

the existing methods to measure the performance of the proposed. The result evaluation shows the improvised throughput, diminished delay and maximized packet delivery ratio of the proposed attaining a decreased latency in the transmission.

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