To Provide a Well-Organized and Proposed Structure to Minimize Packet Delay and Complex Interaction in Mobile Ad-Hoc Network (MANET)

Umeshkumar Kewat, Ganesh Ghone, Lerina Gonsalves

***Abstract*—Mobile ad-hoc network (MANET) is a dynamic network where there is a collection of mobile nodes communicating over a wireless link. Because of its dynamic routing nature the network topology changes again and again over an unpredictable time. Certain change in the network leads to complex interaction and packet delay which lowers the system performance. In order reduce packet delay and congestion in the network we propose an efficient approach to maximize the system performance. We demonstrate the entire network in Network Simulator-2 (NS2) where the simulated results shows that the proposed system gives better performance as compare to previous system.**

***Index Terms*—MANET-mobile ad-hoc network, congestion window, TCP Application, End to End delay, AODV(Ad-hoc on Demand distance vector routing)**

I. INTRODUCTION

A mobile ad-hoc network is a simple network where different mobile node are connected to each other. The advantage to mobile ad-hoc network is the easy communication between the mobile nodes which gives an efficient approach across the network in which there is a transfer of packet from source to destination. While in the current system model many programs need to be resolved. In mobile ad-hoc network where there are several mobile nodes communicating with each other which results out to be a complex interaction which leads to packet delay and affect the mobile Ad-hoc network .Thus it result out to be a bad network. In this paper we concentrate on overall delay in the system, because of that there is a high traffic in the network between the mobile nodes in order to increase the performance. Delay in network means the difference between the time at which the packet is send and the time at which the packet is received. As the points discussed above it gives the efficient approach for the communication of mobile nodes in mobile ad-hoc network. A mobile ad-hoc network (MANET) is a network which doesn't

Have a structure and in those network number of mobile nodes are connected without any physical links i.e. wireless connections and the device in the MANET are independent to move of their own choice. This network consist of peer to peer communication. The establishment and maintenance within the network is done by TCP (Transmission control protocol) it can exchange data amongst the node with help of FTP (File transfer protocol) application it is a connection oriented protocol and it covers the transport layer and session layer of the OSI model. Routing is done with the help of AODV (Ad-hoc on-demand distance vector routing) protocol and the entire network is simulated in network simulator NS2 and according to the results the above method is useful to implement on real mobile ad-hoc network (MANET).

II. LITERATURE SURVEY

There's a multi-hop wireless network in which there are several wireless nodes similar to existing system. In wireless network it is important to get the maximum throughput and utility of the network in [1]. There is interference common in wireless network. It makes the situation worse. In this they have discussed about the efficient approach by scheduling packets in queue and transfer it to the destination. Another concept discussed in [2] is Data Aggregation in multi-hop wireless sensor network. Data aggregation is a key functionality in wireless sensor network (WSN) to minimize delay. Similarly in [3] approach for resource allocation problems in wireless system is optimized in this the approach to multi-hop resource allocation naturally results in a loosely coupled cross layer solutions. The mapping of the algorithms is done to the different layers of the protocol stack and are couple through limited amount of information which results to complex scheduling in MAC layer. Scheduling non-uniform traffic in a packet switching with small propagation delay is [4] where non-uniform traffic is introduced for single hop packet switching system. This traffic model allows arbitrary traffics streams subject only to constraint on this number on data packets which can arrive at any individual source in the system. An approach which Dynamic Scheduling for reducing packet delay which is [5] in this a tandem radio network is considered. Here all the packets have common destination that is one end of the

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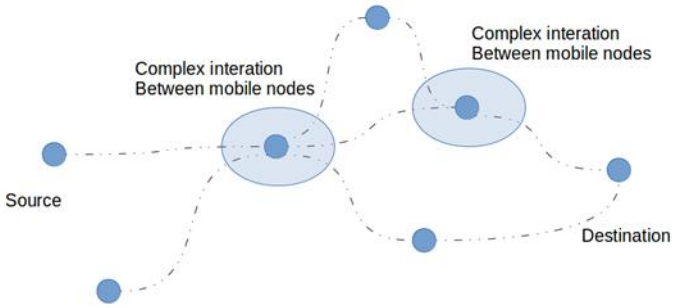
tandem and in this case system modeled by tandem queueing network. This paper have different Sections as follows Section II with the Literature Survey Section III with the System model. Section IV describes the algorithm for increasing the size of congestion window Section V is Results and Analysis. Section VI Conclusion followed by



Reference. Below given diagram describes our basic network where there are several mobile nodes communicating with each other.

Fig 1-Moblie ad-hoc network

III. SYSTEM MODEL

Here we have describe our System Model. For simulating our network we have considered a mobile ad-hoc network where there are set of mobile nodes and a Source and Destination. Each node has a capability of transferring the packet from one end to other which doesn't have a fixed route because the network is Dynamic which indicates that all the mobile nodes in the network are moving. There are different perimeters on which our System is designed. Our network is a wireless channel with radio propagation model and MAC type Mac/802_11 the communication of the network is done in the Link Layer of the OSI model. Protocol used for routing is AODV (Ad-hoc no-demand distance vector routing). We have used to agents TCP (Transmission control protocol) and UDP (user datagram protocol). These are the two agents which are responsible for the management of the network. And the applications used are FTP (File transfer protocol) and CBR (Constant bit rate) because of this two application establishment of the connection within the network is done. TCP manages congestion, both for the connections own benefit and for the benefit of connections as well which is known as TCP Reno.

A. Finding Average delay

In the proposed network there are different methods to be followed. According to this packets flow in a groups as discussed in [1] lower bounds pertaining to system wide average delay are computed. Then the flow comes in the network which are dynamically distributed in many groups that passes through every node and because for of high complex interaction between them the flow gets congested and packets starts dropping which results for delay of packet in the network. Average delay is calculated on the basis of hop count that is the flow of packet on every node. Difference the time at which the packet is send from the source and the time at which the packet gets received at the receiver is the delay in the network. Similarly in [6] they have discussed that in the wireless sensor network transport is responsible for the maintenance of the congestion and the reliability. Here they have designed an application which controls the large amount of packet loss and ensure for end to end delay reliability. We have an algorithm which has a solution for complex interaction that is congestion and the packet delay in the network with the help of this algorithm we will be able to minimize the congestion and packet delay in the network it is a simple approach to the mobile ad-hoc network where we give well organized route for the flow of the packets to every node and try to avoid dropping of packet in the best possible manner.

B. Resizing of Congestion window

In our existing system we give an efficient approach to the flow of packets in the network TCP and UDP are the application which are responsible for inter connection between the nodes in the network TCP is an application which is connection oriented and compare to UDP it has better control over the network. Though TCP is not as fast as UDP application thus it gives a slow start. TCP is suitable for those applications which requires high reliability it also rearranges data pickets in order specified. UDP (User Datagram Protocol) is a protocol which is used for message transport. It is not a connection based protocol so a single program can send a load of packets at a time. It is suitable for applications which need fast, efficient transmission. In our system we use these both application which controls the congestion and the packet drop which will reduce the packet loss at the end. Here TCP gives protection for packet drop and congestion and UDP gives the reliability for the transfer of packets. To increase the load of data packet transfer within the network is done with the help of congestion window here we increase the size of congestion window where the data packet is reliable and more amount of data is travelled through nodes. Thus it reduces the congestion and packet drop in the mobile ad-hoc network. To simulate this we have an algorithm which demonstrates the resizing of congestion window as shown below.

Algorithm: To increase the size of congestion window

```
1: plotting(tcpsource)
2: conges ← set congestion_window at TCPSource
3: now ← current_time
4: When current_time ← current_time + 0.1:
5: call plotting(tcpsource)
```

The above given algorithm is an algorithm for increasing the size of the congestion window in this a procedure id created named as plotting with a variable and then congestion window is set. Further initialization of the current time is done where we increment it by 0.1 every time we call the function this is how the size of the congestion window is increased which allows both the agents to connect within the

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network to increase the performance and throughput. Revising it once again we have considered a mobile ad-hoc network with several mobile nodes including source and destination. Where we have used TCP and UDP agents to maintain the connectivity and the stability of the system which avoid congestion and packet drop in the network. For the flow of data packet size of the congestion window is increased which allows load data packet to transfer from one end to other. The flow char given below demonstrate the working of the entire system.

IV. WORKING OF PROPOSED SYSTEM

Below given diagram illustrate the working of the entire proposed system.

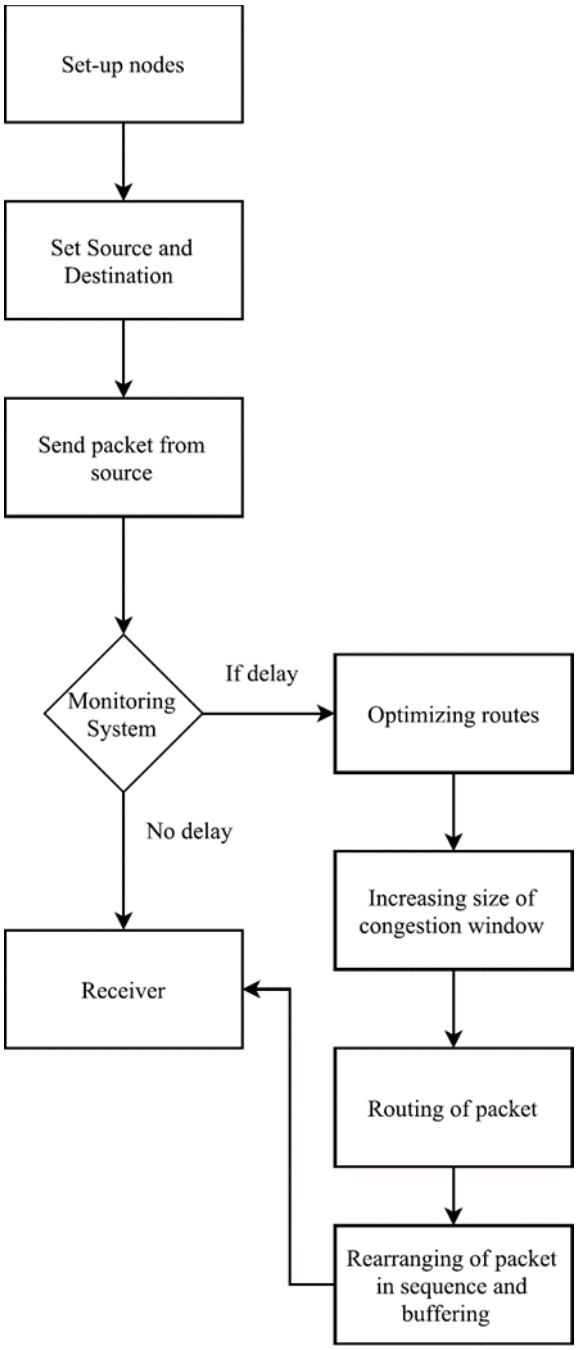
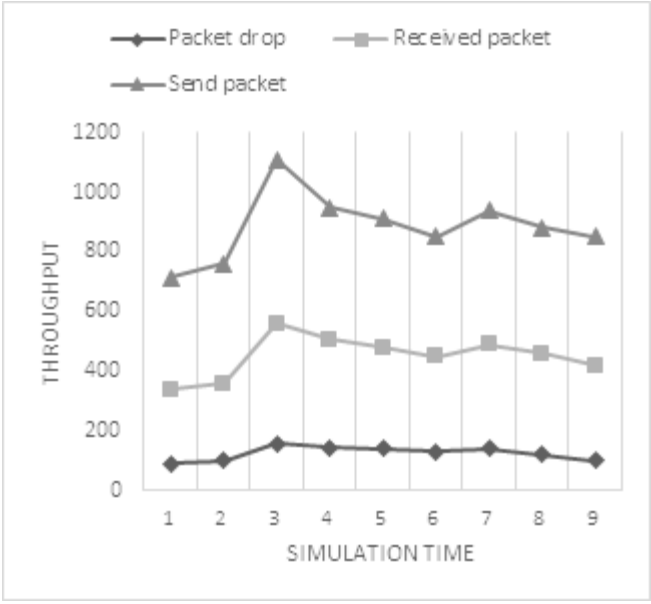


Fig 2- Architecture Diagram

Here we have a system architecture for our proposed system. In the beginning we are need to set up a different mobile nodes in a multi hop wireless network. We need to introduce the source from where we are going send the packets and as well destination to which packets will be delivered. Once, we done with the source and destination, we can start sending packets from source to the desired destination. After sending the packets we should monitor the packets continuously to know the status of the sent packets. If packets doesn't encountered with the congestion and delay, as a result, packets will get delivered to the destination successfully. In other case, if packets encountered with the delay, automatically congestion will take place. As a result, sent packets will be dropped. To avoid this situation we have introduced TCP and UDP concept in the proposed system. Using this mechanism, system maintains the connectivity and as well as the stability. By increasing the size of the congestion window the packet loss problem gets resolved. Because of applying TCP concept twice, it is easy to optimize the different routes. Making the use of AODV protocol, routing of packets can be done. The packets should be rearrange in a sequence before its get delivered to the destination.

V. EXPERIMENTAL RESULTS

To perform the entire simulation we need Network Simulator NS2 which is compatible with both windows and Linux machines. To implement and experiment this proposed system we need a Computer with a configuration of 2GB RAM minimum 10GB of disk space and Core i3 processor with dual boot of Windows and Linux, Trace-graph to plot the analyzed results. Below given charts describes the experimental results. Results for both the



existing model as well as proposed model. We also compare our results [1], [7] and generate graphs for our existing model as well as proposed model. We optimized the routes

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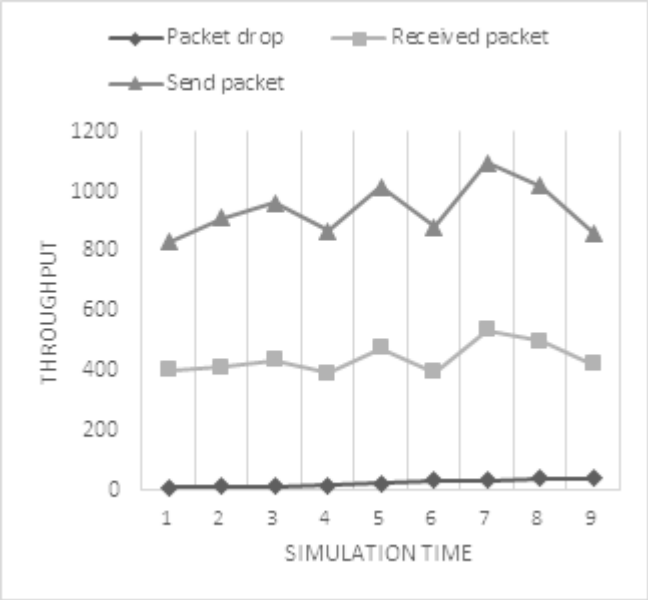
from where all the packet travel and then implemented the



algorithm in which we increase the size of the congestion window. And we collect all the information and compare with each other for an optimal solution.

Fig 3- Shows simulation results for existing model

Fig 4- Shows simulation results for proposed model

VI. CONCLUSION

In mobile ad-hoc network packet delay and complex interaction between them is a serious problem which affects the performance of the system. We have studied several problems faced in MANET due to packet delay. In order to improve the performance and reduce the problems faced in the network we presented an organized approach which helps in reducing the packet delay and complex interaction between them. The simulated results and the analysis shows that our approach gives much better performance compare to previous one.

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