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A NETWORK DATA AND COMMUNICATION ANALYSIS BASED COMBINED APPROACH TO IMPROVE VIDEO TRANSMISSION IN MANET

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***Abstract* –Video transmission over wireless network requires link reliability. Videos are having more data to be transmitted during communication. The criticality and load of the network increases when some video data is communicated over the network. Firstly, describes the characteristics of Mobile Ad hoc Networks and their Routing protocol, and second a mobile ad hoc network (MANET) which consists of set mobile wireless nodes and one fixed wireless server are design using ns-2. In this research we will simulate three MANET routing protocols such as AODV against three different parameters i.e. delay, network load, throughput and retransmission.**

***Keywords*- Multi-media Communication, MANET, QOS, MANET routing protocol (i.e. AODV), NS-2(Network Simulator-2).**

I. INTRODUCTION

Wireless networks are getting popular due to their convenience of use. Consumer or user is no more dependent on wires where he or she is, easy to move and enjoy being connected to the network. One of the great features of wireless network that makes it fascinating and distinguishable amongst the traditional wired network is its mobility. This feature gives the ability to move freely, while user being connected to the network. The Wireless networks comparatively easy to install, on other hand wired network don't. Video transmission over wireless networks to multiple mobile users has remained a challenging problem due to potential limitations on bandwidth and the time-varying nature of wireless channels. Video transmission is one of the part in multimedia communication system. As we know that the multimedia has become an essential part of any presentation. The evolution of internet has also increased the demand for multimedia content. Multimedia is the media that uses multiple forms of information content and information processing (e.g. text, audio, video, graphics, animation, interactivity) to inform or entertain the user.

Mobile ad hoc networks (MANETs) consist of multiple wireless mobile nodes which dynamically exchange data among themselves. MANETs nodes are distinguished by their memory resources, processing as well as high degree of mobility.[1]

I. MANETS ROUTING PROTOCOLS

Routing protocols in MANETs (Murty and Das, 2011) are a challenging and attractive tasks, researchers are giving tremendous amount of attention to this key area (Bouke, 2011).

MANETs routing protocols are categorized into three different categories according to their functionality.

1. Reactive protocols (i.e. AODV,DSR and DYMO)
2. Proactive protocols (i.e. DSDV,OLSR,FSR)
3. Hybrid protocols (i.e. ZRP)

1. Reactive protocols - Reactive routing protocols are only search for a route to a destination when they need to send data to that host.

1(a). AODV - AODV is an on-demand routing protocol used in ad hoc networks. This algorithm facilitates a smooth adaptation to changes in the link conditions.

1(b). DSR - Dynamic Source Routing is a reactive routing protocol for manet ad hoc wireless network. Its characteristics has also on-demand like AODV but it's not table driven. It based on source routing. A node wishing to send a packet specifies the route for that packet.

1(c). DYMO – DYMO is a routing protocol that was created for situations where clients are mobile and communications will be transported through several different clients over a wireless medium Mobile ad-hoc Network (MANET). When a node initiates communication with another host a routing path is found, on demand, and this will result in a bidirectional unicast communication path, if a path is found to the destination. DYMO was created to dynamically handle changes in the network.

II. RELATED WORK

Extensive research work has been done in the field of MANET routing protocols. Different routing protocols were simulated in different kind of simulators. Here we will discuss different research papers about MANET routing protocols performance. In this we will simulate three MANET routing protocols such as DSR, DYMOUM and AODV against three different parameters i.e. delay, network load, throughput and Retransmission.

Due to this characteristic (Keshtgary and Babaiyan, 2012), there are some challenges that protocol designers and network developers are faced with. These challenges include routing, service and frequently topology changes. Therefore routing discovery and maintenance are critical issues in these networks. There are also limited battery power and low bandwidth available in each node. In this paper, we evaluate the performance of four MANET routing protocols using simulations: AODV, OLSR, DSR and GRP.[2] Our evaluation metrics are End-to-End delay, network load, throughput and media access delay. Most of the papers consider the first three parameters, but here we also consider MAC delay.

Path routing and protocol selection are the primary strategies to design any wireless network. In Mobile Ad hoc Network

(MANET) the selected protocol should have best in terms of data delivery and data integrity (Mohapatra and Kanungo, 2011).

The throughput performance in Mobile Ad Hoc Networks (Fazeli and Vaziri, 2011) and compares emulated tested results with simulation results from OPNET (Optimized Network Engineering Tool).

This paper presents a performance analysis of two Mobile Ad Hoc Network (Hosek, 2011) routing protocols - Ad Hoc On Demand Distance Vector (AODV)[8] and Optimized Link State Routing (OLSR).

They address the on-demand routing protocols by focusing on dynamic source routing (DSR) protocol and ad hoc on demand distance vector (AODV) routing protocol in WMNs (Guo and Peng, 2010).

- Wireless Ad Hoc Networks

Han L mentioned [3] that the wireless ad hoc networks were first deployed in 1990's Mobile Ad-hoc networks have been widely researched for many years. Mobile Ad-hoc Networks are collection of two or more devices equipped with wireless communications and networking capability. These devices can communicate with other nodes that immediately within their radio range or one that is outside their radio range.

- An Analytical Model Of Tcp Performance

Debessay Fesehaye Kassa mentioned [4] that the Transmission Control Protocol (TCP) is the dominant transport layer protocol for the end-to-end control of information transfer. Accurate models of TCP performance are a key and basic step for designing, dimensioning and planning IP (Internet Protocol) networks.

- TCP Performance Over Mobile Ad Hoc Network

B. Sikdar et. al. described [5] that TCP is a transport protocol that guarantees reliable ordered delivery of data packets over wired networks. Although it is well tuned for wired networks, TCP performs poorly in mobile ad hoc networks (MANETs). This is because TCP's implicit assumption that any packet loss is due to congestion is invalid in mobile ad hoc networks where wireless channel errors, link contention, mobility and multi-path routing may significantly corrupt or disorder packet delivery.

- TCP Performance Over Multipath Routing In Mobile Ad Hoc Networks

Haejung Lim Kaixin Xu, at all mentioned [6] that in mobile ad hoc networks (MANET), TCP performance is not as stable as in wired networks. TCP performance over a multipath routing protocol is given. Multipath routing can improve the path availability in mobile environment. Thus, it has a great potential to improve TCP performance in ad hoc networks under mobility.

III. PROPOSED WORK

The presented work is about to perform the effective video communication over the mobile network by performing the three stage work. The first stage of this work is to analyze the video frames so that the frame type of route diversion will be performed. The high quality frames will be transferred from different route. In second stage, the contention window decision is taken by analyzing the network parameters. In third stage, the route optimization is done, by analyzing the participation of each node in network communication. The nodes having the heavy participation are ignored for communication whereas the nodes having the lesser communication participation are considered to perform the communication over the network. The network design for the presented work is given here in figure 3.1.

The presented work is about to provide the effective communication in case of congested network or the DOS infected network. The frame analysis provide the work to take the earlier decision so that the effective communication. The effective route generation provides the dynamic analysis on network traffic to provide effective network communication.

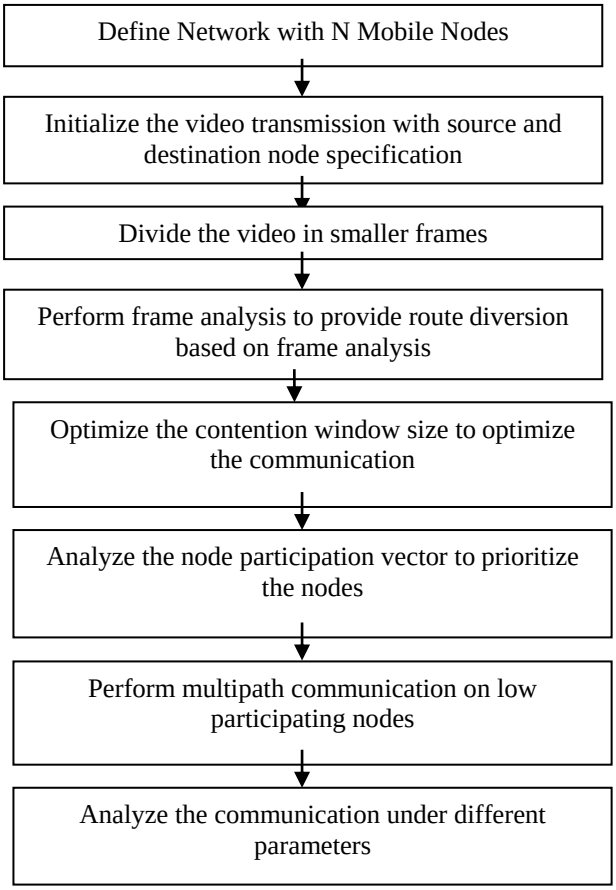

Figure 3.1: Flow of Work

A. ALGORITHM

```
Algorithm(Nodes,N)
/*A Mobile Network is defined with N Number of Nodes*/
{
    Define as Source Node Src and Destination Node Dst
        Set curNode=Src
        [Set Src as Current Node]
      While curNode<>Dst
        [Process All Nodes, till Destination Node not occur]
{       NNodeList=FindNeighbors(Nodes,CurNode)
        [Identify the Neighbor Node List for CurNode]
        For i=1 to N NodeList.Length
        [Process all Neighbor List]
        {
        if(Communication(CurNode,NNodeList(i))>0)
        [If the Neighbor Node is Communicating Node]
        {
```

CommuCount=CommuCount+1
Load=Load+DataCount
[Perform the Communication Analysis on NeighborNode
}}
AvgComm=CommCount/NNodeList.length
[Find the Average Communication Analysis on neighbor node list]
For i=1 to NNodeList.Length
[Process all Neighbor List]
{
if (CommuCount(curNode,NNodeList(i))>AvgComm)
{
set Participation(i)=1
}else if (CommuCount(curNode,NNodeList(i))>AvgComm*2)
{
set Participation(i)=2
}
else
{
Set Participation(i)=0
}}
Disable All Nodes for Communication having Participation Value 2
nextHop=FindPartipentNode(NNodeList,1)
[Identify the Effective Neighbor having Partipation value 1 and set it as Effective Neighbor]
Set curNode=nextHop
[Set Effective communication node as Next communicating Hop]
}}

IV. SIMULATION RESULTS

The work mainly defines an effective video communication routing in energy effective mobile network. The possible outcomes are the simulation results obtained from NS2 which shows the performance parameters such as transmission rate, loss rate, end-to-end delay, packets send and packets received for the both proposed solution and existing network with attack. The simulation results also provide graphical comparison of the networks.The parameters taken in this work for network generation are given here under Table 4.1.

Table 4.1 : Simulation Parameters

Parameters	Values
Communication channel	Wireless
Number of Nodes	10
Area	800x800
Routing Protocol	AODV
MAC Protocol	802.11
Topology	Random
Communication Delay	50 MicroSec
Energy Adaptive	Yes

Here figure 4(a) is showing the simulation scenario for mobile network. The figure is showing the network with 10 nodes. The communication is here performed between a node pair and the large circles here shows the communication range of each mobile node.

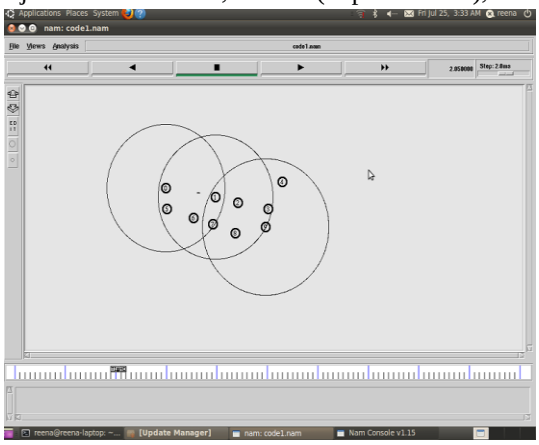

Figure 4(a): Network Design

Here figure 4(b) shows the outcome of data packet transmission in video file communication. Here X- axis represents simulation time and Y-axis represents packet transmission over the network. It shows, the presented work has improved the network throughput.

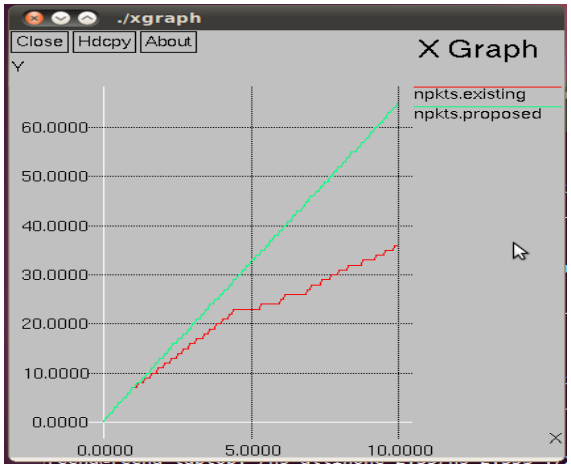

Figure 4(b) : Packet Transmission Analysis (Existing Versus Proposed Approach)

Here figure 4(c) is showing the packet loss analysis as the video data is communicated. Here X-axis represents simulation time and Y-axis represents number of packet lost over the network.

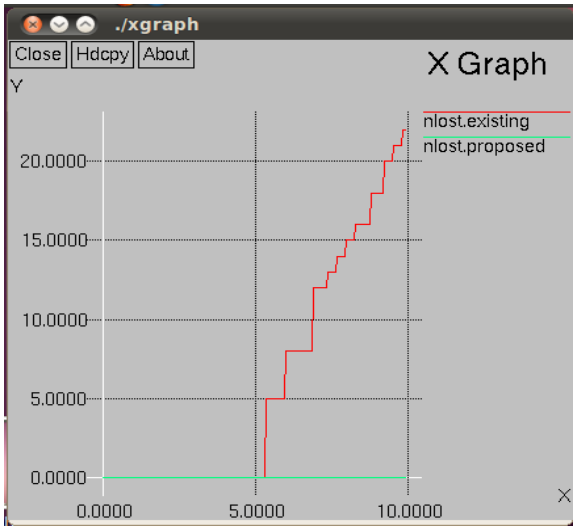

Figure 4(c) : Packet Loss Analysis (Existing Versus Proposed)

Here figure 4(d) is showing the communication delay analysis as the video data is communicated. Here X-axis represents simulation time and Y-axis represents packet delay over the network.

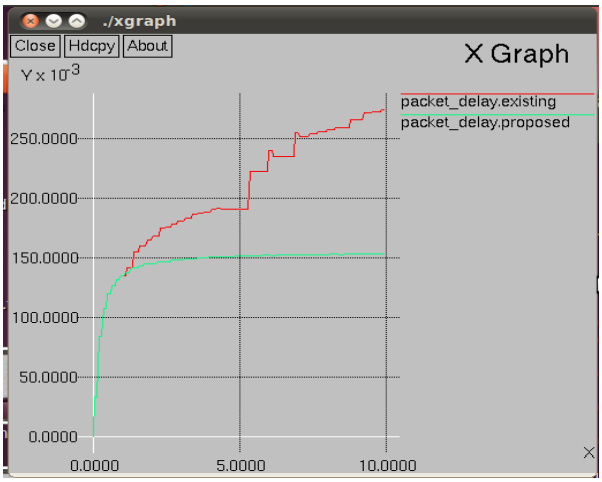

Figure 4(d): Communication Delay Analysis (Existing Versus Proposed Approach)

Here figure 4(e) is showing the packet lossrate analysis as the video data is communicated. Here X-axis represents simulation time and Y-axis represents packet delay over the network.

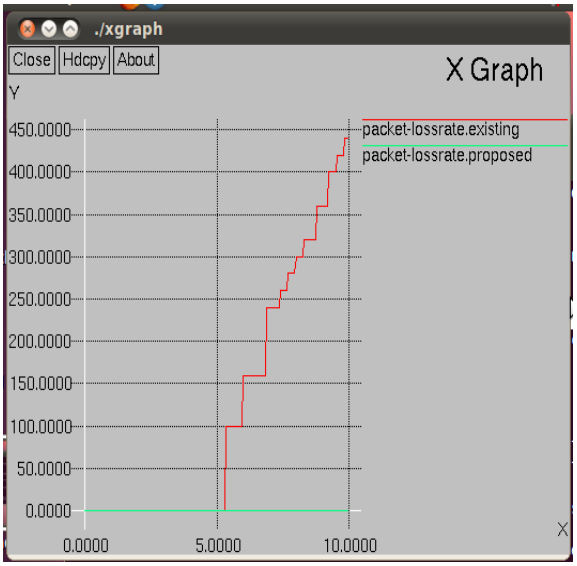

Figure 4(e) : Packet lossrate analysis (Existing Versus Proposed Approach)

V. CONCLUSION

The presented work is about to provide the video communication over the mobile network. The work is divided in three main stages. In first stage, the video frame analysis is done. In second stage, the optimized contention window specification is performed. At third stage, the route optimization is done by observing the node participation dynamically. In this work a multipath communication is defined to generate the effective route over the network. The work is implemented in NS2 environment. The obtained results show the effective route generation in congested video communication over the mobile network. The results shows that the work has reduce the communication loss and improved the network communication. The results are here shown using XGraph.

VI. FUTURE WORK

The presented work is to provide the effective video communication over mobile network by using three stage analysis. The work can be improved under different aspects

- The presented work is about to optimize the network communication by performing the dynamic analysis over the network nodes. The work can be improved by using some session based approach to save the path so that the path identification work will be reduced.
- The work is based on the statistical analysis. The work can be improved by using some optimization approach.

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