ISSN No. 0976-5697

Volume 4, No. 3, March 2013 (Special Issue)

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

To Enhance Video Communication over Wireless Adhoc Network

Amit Kumar Sanghi
Research Scholar, Suresh Gyan Vihar University
sanghiamit@yahoo.com

Abstract - The transmission over wireless network can broadly be classified in two broad categories, as infrastructure wireless network and without infrastructure wireless network. Without Infrastructure wireless network or adhoc network, is an independent system with a certain number of mobile nodes which operate not only as hosts but also as routers. Each node can send and receive data packets, as well as store and forward data packets for other nodes. The connection between any pair of mobile nodes can be setup and maintained dynamically. This type of network does not rely on any pre-existing network infrastructure and it allows rapid deployment and reconfiguration. Video communications recreation is a very important task in present and future wireless networks. One of the key requirements for a successful deployment of multimedia applications is multihop wireless networks which has the ability to provide an acceptable video quality, even under a highly dynamic environment.

This paper directly addresses designing a complete model for transmission of real time video over wireless adhoc network. This deals with a solution of a large number of problems in wireless networking. The practical obstacle is that video traffic, which is heavy and time sensitive, whereas the effective bandwidth is narrow and variable, to make the wireless networking more and more effective and time saving, attention has been given on the areas of minimization of distortion, improvement in the quality parameters i.e. throughput, packet loss, delay, jitter, minimization of energy consumption and reducing the load imposed on the sender also.

Keyword: transmission, distortion, adhoc, throughput, delay, jitter.

I. INTRODUCTION

As a matter of fact, the transport of compressed video significantly contributes to the proper functioning of the traffic in the wireless networks. For transmission over networks, video is typically encoded to reduce the bandwidth requirements. Even compressed video, however, requires large bandwidths of the order of hundred kbps or Mbps. In addition, compressed video stream typically exhibits highly variable bit rates (VBR) as well as long range dependence (LRD) properties. This, in conjunction with the stringent Quality of Service (QoS) requirements (loss and delay) of video traffic, makes the transport of video traffic over communication networks a challenging problem. A lot of work has been done on the subject during the last decade and number of efforts have been made to include the progress and developments in this field. The networking research community is witnessed of an extensive research in all aspects of video transport. The characteristics of video traffic, video traffic modeling, as well as protocols and mechanisms for the efficient transport of video streams, have received a great deal of interest among networking researchers and network operators therefore a excess to video transport schemes have been developed.

Video traffic models, signifying [1,2,3,4,5] strive to capture the essential properties of the real traffic in simple, accurate, and computationally efficient mathematical models. A traffic model is typically developed on the basis of the statistical properties of samples of real traffic, or, in many cases, video traces of the real traffic. Thus video traces are therefore typically a prerequisite for model development. The developed traffic model is verified by comparing the traffic which generates with the video traces. If the traffic model is deemed sufficiently accurate, it can be used for the mathematical analysis of networks, model driven simulations, and also for generating so-called virtual (synthetic) video traces.

The works on video trace creation dissemination begun in 1999 at Telecommunication Networks (TKN) institute headed by Prof. Adam Wolisz at the Technical University Berline. There traces were created for a moderately large number of videos with MPEG-4 and H.263 codecs for a range of different quantization scales (quality levels). The main focused was on single-layer (non-scalable) encoded video which incorporated both encodings with and without rate control for a prescribed target bit rate. Theses traces were first used for simulating video traffic in the wireless video streaming study [6] and described in the article [7].

The paper is focused on designing a complete model for transmission of real time video over wireless adhoc network. This deals with a solution of a large number of problems in wireless networking. The practical obstacle is that the video traffic is heavy and time sensitive whereas the effective bandwidth is narrow and variable. To make the wireless networking more and more effective and time saving attention have been given on the areas of Minimization of Distortion, The quality factors i.e. throughput, packet loss, delay and jitter improvement, Minimization of Energy Consumption and Reducing the load imposed on the sender.

II. MATERIAL AND METHODS

The tool NS2 is an open-source event-driven simulator designed specifically for research in computer communication networks. Since its inception in 1989, NS2 has continuously gained tremendous interest from industry, academia, and government. Having been under constant investigation and enhancement for years,

CONFERENCE PAPER
II International Conference on
"Advance Computing and Creating Entrepreneurs (ACCE2013)"
On 19-20 Feb 2013
Organized by
2nd SIG-WNs, Div IV & Udaipur Chapter , CSI , IEEE Computer Society Chapter India Council ,
IEEE Student Chapter Geetanjali Institute of Technical Studies, Udaipur, Rajasthan, India

NS2 now contains modules for numerous network components such as routing, transport layer protocol, application, etc. To investigate network performance, researchers can simply use an easy-to-use scripting language to configure a network, and observe results generated by NS2. Undoubtedly, NS2 has become the most widely used open source network simulator, and is one of the most widely used network simulators.

After simulation, NS2 provides the outputs both, the text-based as well as animation-based simulation results. To interpret these results graphically and interactively, tools such as NAM (Network AniMator) and XGraph are used. To analyze a particular behavior of the network, users can extract a relevant subset of text-based data and transform it to a more conceivable presentation.

It is worth to express that the tools stated above serve a basic platform for doing the research work. At the same time, according to the need of the research work the tool has been molded and modified, so that the objectives behind the research are solely obtained and achieved.

III. OBSERVATION, RESULT & DISCUSSION

The observation and results made out in the research work in developing the suggested model prove that the model, in all respects is better than the existing one which is already in the practice.

Model is well define in terms of a large number of parameters few of them being channel type, radio-propagation model, network interface type, MAC type, interface queue type, link layer type, antenna model, max packet in ifq, number of mobilenodes, routing protocol, X dimension of topography, Y dimension of topography, time of simulation end, etc.

Realizing that in preparing a model which over comes a number of existing problems that come across in transmission of real-time video over wireless. The main issues are like as, from channel allocation to route selection, from scheduling packets to source coding control and the obstacle that video traffic is heavy and time-sensitive while effective bandwidth is narrow and variable, the present model is designed to meet-out all these problems effectively. The remarkable contribution of the study finds its concentration on the packet forwarding strategy at intermediate nodes, rather than ending nodes.

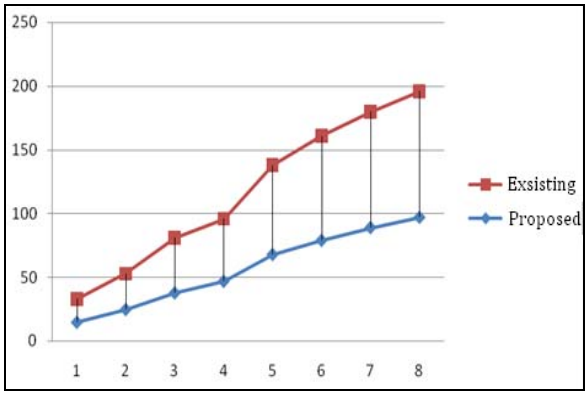

Figure 1 Improvement in Distortion Level

In order to minimize distortion a smart packet selection tectise has been introduce, in the sense that once conzetion occure intermediate nodes are given chances to select the most appropriate packet to forward based on their importance and remaing time to live. The model uses a selection of algorithm that has low complexity compare to other known algorithm proposed for the sending node e.g. CoDiO [8][9][10]. This is noticeable since reinforcing complicated algorithms in every intermediate node will create considerable delay and cumulative power consumption. This, obviously minimizes the distortion.

Model overcomes the problem of collision at receiver node occurring accidently since the two transmitting hosts are not mutually visible. The problem has been dealt by using CTS/RTS in the link layer. Further in the wireless multihop network from once a node sends a packet may be received at more than one node, and a large amount of energy is consumed. The present model saves energy as the retransmission takes place only to active nodes and not to proactive once.

The present model distributes communication over intermediate nodes and as such they share the responsibility of retransmission and packet selection as well as enhancing channel adaptability with the sender. This significantly reduces load on the sender in terms of computation and energy consumption.

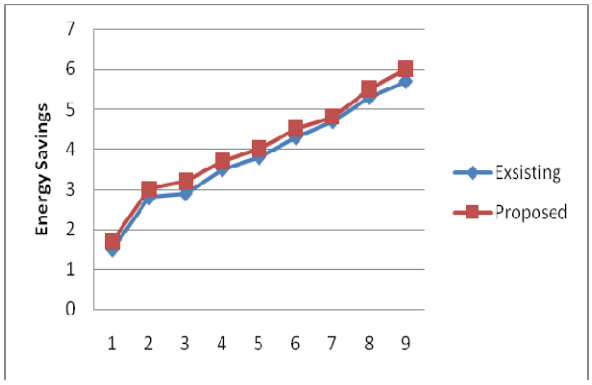

Figure 2 Energy Saving Result display

On implementing these modifications, a sufficient improvement has been observed in energy saving, QoS by reducing distortion, end-to-end delay, jitter, packet loss and so on.

IV. CONCLUSIONS AND IMPORTANT FINDINGS

The significant and purposeful conclusion which can be drawn by preparing the suggested model is that deals with the real-time video communication over adhoc wireless networks designed a node architecture in which each relaying node transiently retains packets so that they can be appropriately selected to forward when congestion occurs. Particularly, retransmission can be made from intermediate nodes instead of the very sender. The shortening of retransmission rounds does result in higher end-to-end success rate of delivery and lower the cumulative power consumption.

Proactive nodes can also detect and drop packets that are useless for the decoding process. Once rejecting

CONFERENCE PAPER
II International Conference on
"Advance Computing and Creating Entrepreneurs (ACCE2013)"
On 19-20 Feb 2013
Organized by
2nd SIG-WNs, Div IV & Udaipur Chapter , CSI , IEEE Computer Society Chapter India Council ,
IEEE Student Chapter Geetanjali Institute of Technical Studies, Udaipur, Rajasthan, India

important frames, a video-cooperative node may also notify other nodes to jointly destroy their dependent packets (that are definitely useless). This mechanism does save both bandwidth and energy for useful packets. To avoid generating communication overhead, NACK messages themselves are used to carry notifications on discarding such important frames.

The framework has been implemented via the introduction of Real-time Media Engine (RtME) that makes relaying nodes more intelligent and responsive. Our lightweight framework is open to other strategies, and does guarantee the interoperability of heterogeneous network nodes, including conventional video-passive forwarders. The deployment of the experiments helped us to understand the behavior of the framework in reality. Extensive results collected from the testbed do demonstrate the soundness and the applicability of the proposed relaying strategy.

V. RECOMMENDATIONS

In the challenging field of technology that is taking place day to day, the need of our is to lower down the load on the battery power without compromising on the quality and efficiency of the models employed in communication. In this direction in future I will look into the implementation of optimize the coding design In order to cater the diverse need of the users, I consider developing more algorithms for packet selection to satisfy different goals. For instance QoS definition might be different from user to user; some operations such as military communication may be strict on delay whereas professional applications, e.g. surveillance and monitoring, are sensible to packet loss.

It is also recommended that extension of the frame work from multicasting over video communication in adhoc network should also be considered in the future designing of the model, which at present is possible only on the internet

VI. REFERENCES

[1]. "Traffic Characteristics of H.264/AVC Variable Bit Rate Video", Geert Van der Auwera, Prasanth T.David, and Martin Reisslein, in IEEE Communications Magazine, pp 164-174, Nov 2008

[2]. Jun Dai, Jun Li "VBR MPEG Video Traffic Dynamic Prediction Based on the Modeling and Forecast of Time Series", at INC, IMS and IDC, NCM '09, fifth International Joint Conference , pp 1752-1757 in Aug 2009.

[3]. Min Dai, Yueping Zhang and Dmitri Loguinov, "A Unified Traffic Model for MPEG-4 and H.264 Video Traces", in IEEE Transactions on Multimedia, vol.11, No,5, pp 1010-1023, Aug 2009

[4]. Xin Liu, Navid Ghazisaidi, Liviu Ivanescu, Rui Kang, and Martin Maier, "On the Tradeoff Between Energy Saving and QoS support for Video Delivery in EEE-Based FiWi Networks Using Real-World Traffic Traces" in Journal of Lightwave Technology, Vol.29, Iss.18, pp:2670-2676, Sep 2011

[5]. Yongfei Zang, Jinyao Yan, "Tuning Self-Similar Traffic to Improve Loss Performance in Small Buffer Routers", in Tenth International Conference on Networks,ISBN:978-1-61208-113-7,pp: 105-108, in Jan. 2011

[6]. F. Fitzek and M. Reisslein, "A prefetching protocol for continuous media streaming in wireless environments," IEEE Journal on Selected Areas in Communications, vol. 19, no. 10, pp. 2015-2028, Oct. 2001.

[7]. _____,"MPEG-4 and H.263 video traces for network performance evaluation," IEEE Network, vol. 15, no. 6, pp. 40-54, November/December 2001, video traces available at http://trace.eas.asu.edu.

[8]. E. Masala. 1., CF Chiasserini. 2., M. Meo. 2., JC De Martin "Real-Time Transmission Of H.264 Video Over 802.11-Based Wireless Ad Hoc Networks"

[9]. Tang et al. / Computer Communications 29 (2006) 1917–1926

[10]. E. Crawley et al., "A Framework for QoS-Based Routing in the Internet," RFC 2386, http://www.ietf.org/rfc/rfc.238.txt, Aug. 1998.

[11]. Dharm Singh, Integrated System Design for Video on Demand over IP, PhD thesis, 2008.