High Bandwidth & Low Cost Effectiveness for Large Size HD Video Streaming over Heterogeneous Wireless Networks

D. Govindarj[1] Kavitha. P[2]
[1,2]Kaamadhenu Arts and Science College, Malayadipudur, India

Abstract— Video streaming is the fast charm in the midst of cellular phone users. The most up to date cell phones, for example, advanced cells and tablets, are equipped with various remote system interfaces like WIFI, LAN. The issue of versatile is video spilling from a server to multinetwork customers over different access systems, with the objective of limiting the mutilation of the got recordings. With a specific end goal to manage high video gushing perfection while diminishing the remote administration cost. The ideal video gushing procedure with various splitted records is figured as a Markov Decision Process (MDP). We exhibit models to catch the system conditions and video attributes and build up a whole number program for deterministic bundle planning. To determine the MDP in simultaneous, we prescribe a versatile, best-activity seek calculation to acquire a problematic arrangement. To gauge the introduction of the proposed adjustment calculation, we executed utilizing neighborhood. To conquer this issue, the extent of the video fragments ought to be splitted and further measured for variable piece rate (VBR) recordings to advance the transfer speed estimation exactness.

Key words: Markov Decision Process, Bandwidth Cost, VBR, HD Live Streaming

I. Introduction

Video streaming is fast popularity among mobile phone users recently. Many web-based services involve sharing of content like digital audio, video, streaming presentations, and live news feeds through circulated networking technologies, like Multiple Wireless access networks (MWAN's), multicast networks, and peer-to-peer networks. Unfortunately, these current distributed systems, designed to share the content to a big collection of users, also provide a platform for adversarial users to launch a myriad attacks with widespread consequences. For example, smart phones and tablets are usually equipped with cellular, Wi-Fi and Bluetooth interfaces.

Using a few connections in the meantime as can enhance video gushing in a few perspectives: the amassed higher transfer speed can bolster video of higher piece rate; when one remote connection endures poor connection quality or clog, the others can make up for it.

For each gushing advance, we characterize a state to depict the present circumstance, including the file of the asked for portion, the current accessible data transfer capacity and other strategy parameters. A limited state Markov Decision Process (MDP) can be modelled for this support learning task.

Today popular of mass-viewed content is dynamically generated and rich in multimedia that include combination of text, audio, still images, animation, video, and interactive content forms that are gathered from a many of sources, assembled and presented to the user. In such scenarios, malicious variation of content by malicious sources becomes a justifiable threat. To highlight this point, in recent times, Google and MSN (Microsoft(R)) were experimental to be distributing malware after attackers were able to trick the arranges by taking on the appearance of a genuine publicizing supplier and embeddings vindictive advertisements(by misusing two Internet Explorer, one Java, and four Adobe Reader defects) that introduced the HDD Plus malware. YouTube was likewise a casualty of an assault where noxious code was embedded into pages (by abusing a cross-site scripting helplessness) showing the focused on recordings that would dispatch when clients opened the video cut diverting clients to explicit locales and show adulterated news cautions. While flaws in software that were exploited were eventually patched, these attacks could be prevented by

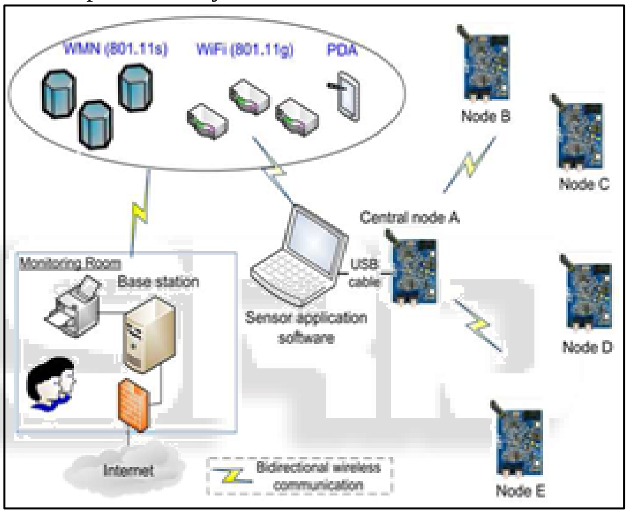

Fig: Heterogeneous Network Topology

II. Related work

Video streaming is acquisition reputation among cellular phone users in recent times. Considering that the mobile devices have controlled computational capability and energy supply, and the wireless channels are extremely dynamic, it is very difficult to present high quality of video streaming services for mobile users every time.

In the new framework is constant versatile best-activity Search calculation for video spilling over different remote Access systems. The objective is to give trustworthiness, birthplace confirmation, and non-denial for singular hinders that involve an advanced stream. We formulated the video streaming technique as an MDP.

III. New system model

To protect such delay-sensitive digital streams against malicious attacks, security mechanisms must efficiently process long sequence of bits in a manner that allows receivers to verify the authenticity of the stream in portions (to avoid possessing the entire stream before verification) without excessive processing delays associated with each portion of the stream. This is typically done by dividing the stream into blocks (or chunks) and using an efficient security mechanism to secure each block of data. Our technique minimizes delays in transmitting a stream following the block-signing process and playback of the stream following the block-verification process.

An unequal video outline booking calculation to limit the normal aggregate mutilation by exploiting separated transmission for Intra (I) and Predicted (P) frames.

Algorithm: **Unequal video frame scheduling**
Input: fRTTp; pp; cwndpgp2P, encoded video frames;
Output: Sub-optimal scheduling vector ffmg1_m_M;
1. Resort P according to the loss-free bandwidth;
2 for m ¼ 1 toM do
3 if fm ¼1then
4 Invoke Frame_Action(m);
5 end
6 Procedure Frame_Action(m):
7 forall parent frames k of m do
8 if fk ¼¼ 0 then
9 fm ¼¼ 0; " Proactively drop frame m
10 end
11 if fk ¼¼ 1then
12 Invoke Frame_Action(k);
13 end
14 end
15 Invoke Frame_Delivery(m);
16 end

The outline of the data distribution system is shown in Algorithm 1. To ensure the high-priority frames can be dispatched first, the algorithm seeks to schedule all the parent frames in the socket buffer that are not delivered yet. If one of the parent video frames cannot be delivered due to the bandwidth limitation, the proposed algorithm drops the current frame.

In order to improved experiment the probability and robustness of our approach, some different configurations of the encoded videos are listed, which are shown in Table I

	Resolution	Avg. bit-rate (Kbps)	Std bit-rate deviation	Y-PSNR (dB)	Layer
Cfg 1	320×180	112.84	39.01	30.99	1
	320×180	238.94	88.84	32.63	2
	640×360	363.82	140.33	35.9	3
Cfg 2	640×360	235.4	92.09	35.37	1
	1280×720	531.1	215.97	38.53	2
	1280×720	1,056.9	469.1	41.5	3

Table 1: Video Configurations

A. Variable Bitrate (VBR)

Variable bitrate (VBR) is a term utilized as a part of media communications and processing that identifies with the bitrate utilized as a part of sound or video encoding. Instead of consistent bitrate (CBR), VBR documents change the measure of yield information per time fragment. VBR permits a higher bitrate (and in this way requires more storage room) to be dispensed to the more mind boggling portions of media documents while less space is assigned to less perplexing sections. The normal of these rates can be computed to create a normal bitrate for the record.

B. Video Streaming With High Security

In this part, we have planned more than a few techniques for stream (or flow) authentication that aim at minimizing the calculation and communication transparency related with securing individual blocks that comprise a stream., It require time synchronization between content publisher and verifier, Adequately bulky buffers of all unconfirmed blocks, and storage of long key chains which can guide to scalability issues. This makes a smaller amount suitable for authenticating stream, and vulnerable to DoS attacks that root buffer spread out.

In the authentication method, provably protected in a formal adversarial network model that limits the capabilities of an opponent to infuse and obliterate packets by distinct quantities. The mark procedure for the entire stream and includes just a constant size validation overhead for every bundle, be that as it may, requires the sender to have the whole stream past to marking. The video files are uploaded in the peer accessibility later than fragmentation. The files are encoded and stored in the MWAN network for safety which helps in packet loss and behave badly of nodes.

C. Adaptive Video Streaming

In this part, the components incorporate a center server farm, numerous edge stores each serving different customers, and the MWAN spine (Internet or WAN). The accumulated higher data transfer capacity can bolster video of higher piece rate; when one remote connection endures poor connection quality or blockage, the others can make up for it. High strength to data transfer capacity variety and simple organization are both vital necessities for video gushing applications. We set up the multi-interface video spilling process as a support learning assignment. For each spilling venture, we characterize a state to portray the current circumstance, including the file of the asked for fragment, the current accessible data transmission and other framework parameters. The video streaming process can also be considered as the interaction between two modules. The downloading and estimation steps in the top grey rectangle can be viewed as an integrated environment module, and the rate adaptation agent can be viewed as an agent module. The video streaming process can be formulated as a reinforcement learning task. Each user periodically sends information about download stats, like: download speed; round trip time; download bytes and server availability.

IV. Conclusion & Future Enhancement

In this paper, we planned a real-time adaptive best-action search algorithm used for video streaming in excess of multiple wireless access networks. Primary we formulated the video streaming process as an MDP. To attain smooth video streaming with high quality, we cautiously designed the reward functions. Next, with the proposed rate adaptation algorithm, we can resolve the MDP to get a sub-optimal solution in actual time. Finally, we implemented the proposed algorithm and conducted sensible experiments to evaluate its performance and compare it with the state-of-the-art algorithms. The experiment consequences showed that the proposed solution can achieve a inferior establish latency, advanced video quality and improved softness. There are immobile many open issues to investigate in the future. Initial, how to improved assign the loads flanked by more than a few links with finer granularity should be investigated. Second, to better predict the future bandwidth, the majority new inference of bandwidth should be assigned with a higher weight. To wrap things up, the extent of the video portion ought to be additionally measured for variable piece rate (VBR) recordings to show signs of improvement the transfer speed estimation exactness.

REFERENCES

[1] T. Stockhammer, "Dynamic adaptive streaming over HTTP –: standards and design principles," in ACM MMSys'11, 2011, pp. 133–144.
[2] K. Tappayuthpijarn, T. Stockhammer, and E. Steinbach, "HTTP-based scalable video streaming over mobile networks," in IEEE ICIP'11, 2011, pp. 2193–2196.
[3] R. Mok, X. Luo, E. Chan, and R. Chang, "QDASH: a QoE-aware DASH system," in ACM MMSys'12, 2012, pp. 11–22.
[4] C. Mueller, S. Lederer, and C. Timmerer, "A proxy effect analyis and fair adatpation algorithm for multiple competing dynamic adaptive streaming over HTTP clients," in IEEE VCIP'12, 2012, pp. 1–6.
[5] T. Kupka, P. Halvorsen, and C. Griwodz, "Performance of on-off traffic stemming from live adaptive segmented HTTP video streaming," in IEEE LCN'12, 2012, pp. 401–409.
[6] S. Akhshabi, S. Narayanaswamy, A. C. Begen, and C. Dovrolis, "An experimental evaluation of rate-adaptive video players over HTTP," Signal Processing: Image Communication, vol. 27, no. 4, pp. 271–287, 2012.
[7] S. Xiang, "Scalable Video Transmission over Wireless Networks," Ph.D. dissertation, University of Victoria, 2013.
[8] S. Xiang and L. Cai, "Transmission control for compressive sensing video over wireless channel," IEEE Trans. Wireless Commun., vol. 12, no. 3, pp. 1429–37, 2013.
[9] M. Kobayashi, H. Nakayama, N. Ansari, and N. Kato, "Robust and efficient stream delivery for application layer multicasting in heterogeneous networks," IEEE Trans. Multimedia, vol. 11, no. 1, pp. 166–176, 2009.
[10] V. Bui, W. Zhu, A. Botta, and A. Pescape, "A Markovian approach to multipath data transfer in overlay networks," IEEE Trans. Parallel Distrib. Syst., vol. 21, no. 10, pp. 1398–1411, Oct. 2010.
[11] D. Ma and M. Ma, "A QoS oriented vertical handoff scheme for WiMAX/WLAN overlay networks," IEEE Trans. Parallel Distrib. Syst., vol. 23, no. 4, pp. 598–606, Apr. 2012.
[12] J. Wu, B. Cheng, C. Yuen, Y. Shang, and J. Chen, "Distortion aware concurrent multipath transfer for mobile video streaming in heterogeneous wireless networks," IEEE Trans. Mobile Comput., vol. 14, no. 4, pp. 688–701, Apr. 2015.
[13] Jiyan Wu, Member, IEEE, Chau Yuen, Senior Member, IEEE, Ming Wang, and Junliang Chen, "Content-Aware Concurrent Multipath Transfer for High-Definition Video Streaming over Heterogeneous Wireless Networks", in IEEE Transactions on Parallel and Distributed Systems(Volume: 27, Issue: 3, March 1 2016)

