www.ijaret.org Vol. 1, Issue IX, Oct.2013
ISSN 2320-6802

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY
WINGS TO YOUR THOUGHTS…..

Optimal Pricing for Video Streaming To Avoid Redistribution Preventing QoS Using 3DTV Systems

D.Sunil[1], Y.Ramesh[2], B.Madhusudhan Rao[3], B.KiranKumar[4]

[1]Final year M.tech Student, [2] Associate Professor, [3,4]Asst.professor
[1, 2, 3] Avanthi Institute of Engineering and Technology (JNTUK), Cherukupally, VizianagaramDist, Andhra Pradesh, India
[4]Shri Vishnu Engineering College for Women, Bhimavaram, Andhra Pradesh, India

Abstract: *The scope and prospective of mobile technologies increasing day in and day out. With the latest advancements in 3G, 4G and even 5G networks supported smart phones enable user to watch live video streaming downloading video on move is much easier by subscribing data planes from the service providers. Due to the presence of mobile to mobile data transfer technologies like Bluetooth and others standard techniques subscribers can redistribute the video content to non subscriber. Such a redistribution mechanism is a potential threat to for the mobile service provider and it is highly difficult to trace from which mobile the data has been transferred or redistributed. To avoid this service provider has too setup a reasonable price for the data plan to prevent such unauthorized redistribution methods to maximize their own profit. In this paper we try to best data plans for the subscribers in order to minimize the redistribution and we also address two key factors on the quality and user acceptance. Such an analysis will preserve the service provider profit under the threat of redistribution network and the QoS to the end users using 3DTV Systems.*

Index Terms—*Game theory, mobile video streaming, pricing, Optimal Pricing, Video Streaming, Redistribution.*

1. INTRODUCTION

Ubiquitous Multimedia Access (UMA) has become a very common topic within the multimedia community during the last few years. Research centers and telecom providers address new, smart and efficient solutions for the ubiquitous access to multimedia data and in particular videos, from everywhere with mobile devices (laptops, PDAs or last generation cellular phones). Possible applications of such technology include consumer entertainment and digital TV broadcasting, video conferencing, telemedicine and telemanipulation, military applications, and remote video surveillance. All these applications share several technological challenges. On the one side, videos pose serious problems in terms of both amount of data transferred on the network and computational resources. On the other side, mobile devices and UMA scenario require accessibility through different and often limited wireless networks, either 802.11 Wi-Fi, 3G networks such as HSPA[1] (High Speed Packet Access) and UMTS (Universal Mobile Telecommunications Service), or even 2/2.5G networks such as GPRS (General Packet Radio Service) or EDGE-GPRS (Enhanced Data rates for GSM Evolution). These conflictual requirements—high data volumes and limited resources—emphasize the need for efficient codecs for both downloading and streaming applications. In the case of video data, the goal is to allow UMA services to maintain a sufficient quality for human users. Nevertheless, in some emerging applications the data quality and the compression factors must be evaluated against the more restrictive requirements of "non-human users", i.e., software that processes and interprets the received data. The meaning of the term "mobile" is quite hazy and might assume different meanings, depending on the context: for example it could be an installation not constrained to remain in a fixed location, a moving device, a portable device (such as handhelds and laptops), or finally a battery-powered device. However, in multimedia the term "mobile" is generally related to the connectivity. Accordingly, here we assume that the reference mobile Video surveillance system [2] is provided with an ubiquitous wireless connectivity (either on the server, on the client or on both).Conversely the term "fixed" will be used to consider systems with wired connectivity. Unlike with Wi-Fi which you can get for free in hotspots, you need to be subscribed to a service provider to get 3G network connectivity. We often call this kind of service a data plan or network plan. Your device is connected to the 3G network through its SIM card (in the case of a mobile phone) or its 3G data card

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY
WINGS TO YOUR THOUGHTS…..

(which can be of different types: USB, PCMCIA etc.), which are both generally provided/ sold by the service provider. Through that, you get connected to the internet whenever you are within a 3G network. Even if you are not in one, you can still use 2G or 2.5G services provided by the service provider. According to a survey on the popularity of mobile devices, almost every person has at least one cell phone in developed countries, and video consumption over mobile devices is an emerging trend. With such a high popularity and the convenient phone-to-phone communication technologies, it is very possible for data-plan subscriber to redistribute the video content without authorization [3]. For example, some users who do not subscribe to the data plan may wish to watch television programs while waiting for public transportation, and some of the them might want to check news from time to time. Hence, these users have incentives to buy the desired video content from neighboring data subscribers if the cost is lower than the subscription fee charged by the service provider. Unlike generic data, multimedia data can be easily retrieved and modified, which facilitates the redistribution of video content. In addition, subscribers also have incentives to redistribute the content with a price higher than their transmission cost, as long as such an action will not be detected by the content owner. Due to the high mobility, time sensitiveness, and small-transmission-range characteristics of mobile devices, each redistribution action only exists for a short period of time and is very difficult to track. Consequently, a better way to prevent copyright infringement is to set a pricing strategy such that no subscriber will have the incentive to redistribute the video. Wireless technologies are a way for mobile users to make free or cheap calls worldwide and save a lot of money due to the latest telephony applications and services. 3G networks have the advantage of being available on the emitting router. So, a user with a 3G phone and a 3G data plan is well- equipped for making free mobile calls. She will only have to download one of the free Applications and install on her mobile phone and start making calls.

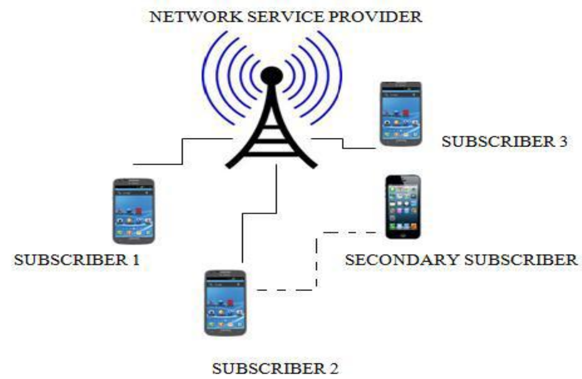

Figure 1: An example of a mobile video stream redistribution network

We introduce the system model in Section II. We analyze the optimal strategies for all users in the redistribution network and prove the existence of the equilibrium when there is only one secondary buyer and We then analyze the mixed-strategy equilibrium for the scenario with multiple secondary buyers, the content owner is also considered as a player who sets the price to maximize his/her payoff but does not prevent the video redistribution among users, In section III we are discussing about QoS Extension, and Conclusions are drawn in Section IV.

2. SYSTEM ARCHITECTURE

In this section, we will introduce the channel, transmission, and video rate- distortion models for the transmission of video streams over wireless networks.

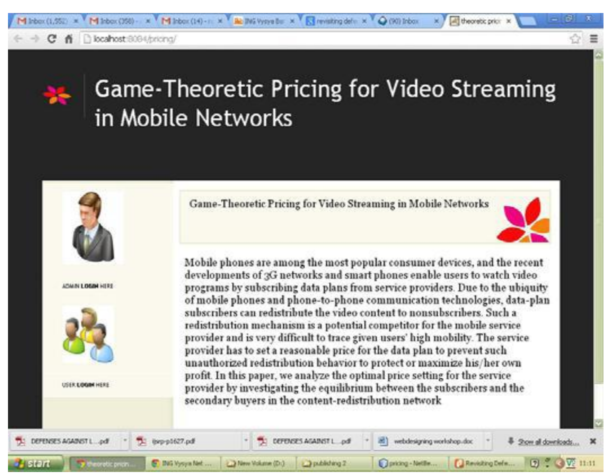

Figure 2: Screen Shot of Video Streaming

2.1. "G"-ADVANCEMENTS

3G, short for third Generation, is the third generation of mobile telecommunications technology.3G telecommunication networks support services that provide an information transfer rate of at least 200 kbit/s. However, many services advertised as 3G provide higher speed than the minimum technical requirements for a 3G service. Later 3G releases, often denoted 3.5G and 3.75G, also provide mobile broadband accessofseveral Mbit/s to Smartphone's an d mobile modems in laptop computers.3G finds application in wireless voice telephony, mobile Internet access, fixed wireless Internet access, video calls and mobile TV.

The following common standards comply with the IMT2000/3G standard [4- 5]:

- EDGE, a revision by the 3GPP organization to the older 2G GSM based transmission methods, utilizing the same switching nodes, base station sites and frequencies as GPRS, but new base station and cellphone RF circuits. It is based on the three times as efficient 8PSK modulation scheme as supplement to the original GMSK modulation scheme. EDGE is still used extensively due to its ease of upgrade from existing 2G GSM infrastructure and cell-phones.
- EDGE combined with the GPRS 2.5G technology is called EGPRS, and allows peak data rates in the order of 200 kbit/s, just as the original UMTS WCDMA versions, and thus formally fulfills the IMT2000 requirements on 3G systems. However, in practice EDGE is seldom marketed as a 3G system, but a 2.9G system. EDGE shows slightly better system spectral efficiency than the original UMTS and CDMA2000 systems, but it is difficult to reach much higher peak data rates due to the limited GSM spectral bandwidth of 200 kHz, and it is thus a dead end.
- EDGE was also a mode in the IS-135 TDMA system, today ceased.
- Evoved EDGE, the latest revision, has peaks of 1 Mbit/s downstream and 400 kbit/s upstream, but is not commercially used.
- The Universal Mobile Telecommunications System, created and revised by the 3GPP. The family is a full revision from GSM in terms of encoding methods and hardware, although some GSM sites can be retrofitted to broadcast in the UMTS/W-CDMA format.
- W-CDMA is the most common deployment, commonly operated on the 2,100 MHz band. A few others use the 850, 900 and 1,900 MHz bands.
- HSPA is an amalgamation of several upgrades to the original W-CDMA standard and offers speeds of 14.4 Mbit/s down and 5.76 MBit/s up. HSPA is backwards compatible with and uses the same frequencies as W-CDMA.
- HSPA+, a further revision and upgrade of HSPA, can provide theoretical peak data rates up to 168 Mbit/s in the downlink and 22 Mbit/s in the uplink, using a combination of air interface improvements as well as multi-carrier HSPA and MIMO. Technically though, MIMO and DC-HSPA can be used without the "+" enhancements of HSPA+
- The CDMA2000 system, or IS-2000, including CDMA2000 1x and CDMA2000 High Rate Packet Data (or EVDO), standardized by 3GPP2 (*differing* from the 3GPP), evolving from the original IS-95 CDMA system, is used especially in North America, China, India, Pakistan, Japan, South Korea, Southeast Asia, Europe and Africa.
- CDMA2000 1x Rev. E has an increased voice capacity (in excess of three times) compared to Rev. 0 EVDO Rev. B offers downstream peak rates of 14.7 Mbit/s while Rev. C enhanced existing and new terminal user experience.

While DECT cordless phones and Mobile WiMAX standards formally also fulfill the IMT-2000 requirements, they are not usually considered due to their rarity and unsuitability for usage with mobile phones. In telecommunications, **4G** is the fourth generation of mobile phone mobile communication technology standards. It is a successor to the third generation (3G) standards. A 4G [6] system provides mobile ultra-broadband Internet access, for example to laptops with USB wireless modems, to smart phones, and to other mobile devices. Conceivable applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television, and cloud computing. Two 4G candidate systems are commercially deployed: the Mobile WiMAX standard (first used in South Korea in 2006), and the first-release Long Term Evolution (LTE) standard (in Oslo, Norway and Stockholm, Sweden since 2009).

Vol. 1, Issue IX, Oct.2013
ISSN 2320-6802
INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY
WINGS TO YOUR THOUGHTS…..

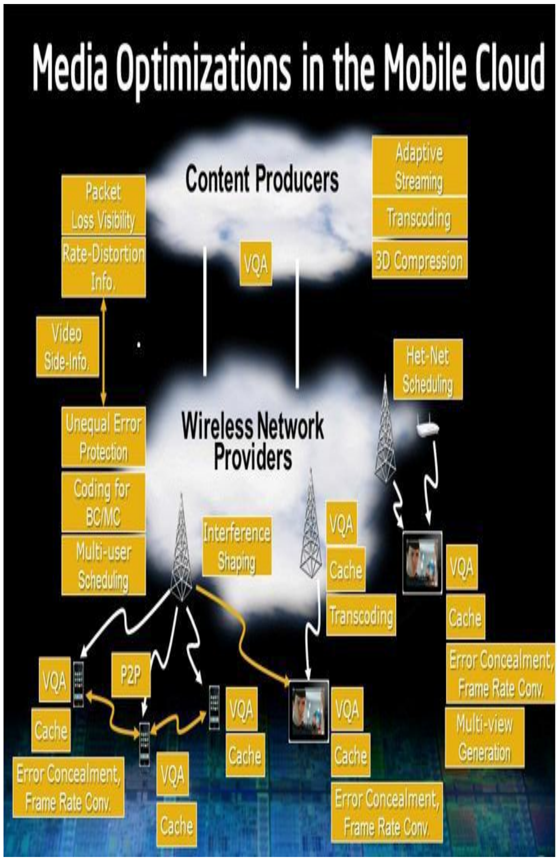

Figure 3: Example of a mobile video streaming redistribution network

2.2 OPTIMAL CHARGES FOR THE CONTENT OWNER

In the previous sections, we have discussed the equilibrium and the optimal pricing strategy in the video redistribution networks. Our assumption there is that the content owner would like to set price smaller than the equilibrium price in the redistribution network. By doing so, the secondary buyers would have no incentives to purchase the video content from the subscribers and will always subscribe to the data plan from the service provider's goal is not the prevention of video redistribution but rather the maximization of his/her own income. We include the service provider as a player in the game and find his/her optimal strategies.

Figure 4: Optimal video stream price versus qualities of network and streaming service

2.3ULTRA GAME MODEL AND EVOLUTION DYNAMICS

Here, we model the video pricing problem for the content owner as a no cooperative game, which can be played several times. For example, in practical scenarios, the service provider can always change the price if the total income is below the expectation. Also even when the price is fixed, mobile users can change their mind on whether to subscribe to the data plan or to purchase from other subscribers. Such natural repetition help the players find the equilibrium. Game stages: in the video pricing game, the first mover's s the service provider, who first sets the price of the video content. Then, mobile users who are interested in the video content decide whether to subscribe to the video streaming service [10]. Since, based on the video content are possible, mobile users also take into consideration the possible payoffs that they can get in the redistribution network when making the decision. Before the game starts, each user, either a subscriber or the secondary buyer, will declare his/her presence to all other users within his/her presence to all other users within his/her transmission range.

3. QUALITY IMPROVEMENT BY 3DTV FOR END USERS

Mobile 3DTV system is conceptualized by Fig. 5, i.e. stereoscopic video content is captured, effectively encoded, and then robustly transmitted over DVB-H to be received, decoded and played by a DVB-H enabled handheld. At the stage of 3D content creation and coding currently there is no single and generally adopted representation format for stereo video, taking specific mobile channel conditions into account. Most natural is to have two-channel stereo video. Capture of such video by synchronized cameras is relatively easy and the coding can be done efficiently within the framework of the emerging multi-view coding (MVC) amendment of the H.264 AVC standard [7]. However, compared to simulcast, the gain of MVC compression is not high. An alternative is offered by the representation known as single-view video plus depth format, already standardized under the notion of MPEG-C, Part 3 [7]. Such representation leads to good compressibility, as the depth adds less than 20% to the bit-budget of a single video channel [8] but requires additional techniques for depth estimation at the content creation side and depth image based rendering at the receiving side. A new concept of mixed spatial resolution is expected to cope with the problems of fast rendering and efficient compression [7]. All three above-mentioned data representations are being analyzed, compared and optimized within the scope of the MOBILE3DTV project.

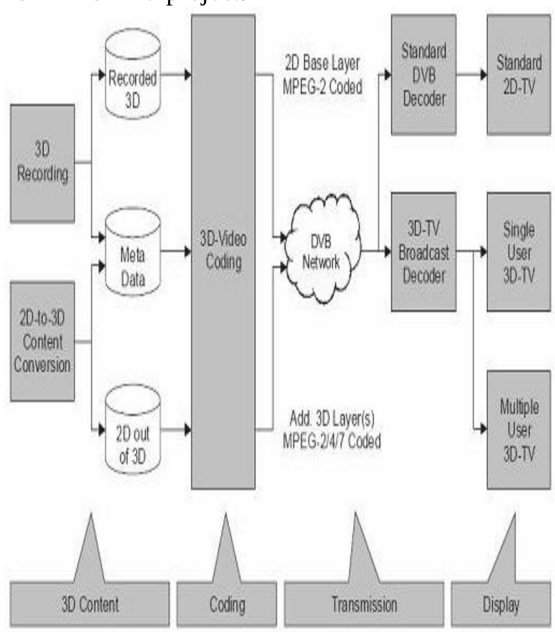

Figure5: Mobile 3DTV concept

DVB-H is considered to be the broadcast media of future mobile 3DTV. The standard has been a very successful development from the initial idea through comprehensive research and development to commercial services. Key issue is its flexibility. It is not just a tiny TV channel but rather general and powerful data broadcast technology. Would it be appropriate for carrying stereo video is a tempting research problem being studied by the MOBILE3DTV project. So far, DVB-H has been extensively studied for its capability to provide error protection related with the importance of the content to be transmitted (i.e. unequal error protection - UEP) [9]. However, nothing has been done so far concerning the error protection of stereo-video content [10] over such a channel. It might be well protected by the current tools but it might also turn that it needs novel and more comprehensive UEP schemes.

4. CONCLUSION AND FUTURE WORK

In this paper, we have observed noted the premium charges for mobile video data by analyzing the video redistribution network between data plan subscribers and nonsubscribers. We have first analyzed the equilibrium price of the video stream redistributed by the subscribers given the number of subscribers and secondary buyers. We have presented a streaming system that utilizes interleaved transmission for real time H.264/AVC video [11] and AAC LC audio in 3G wireless environments. We have considered audio to be of highest priority. The result provides a guideline for the content owner to prevent the redistribution behavior and to maximize the service provider's payoff. The redistribution behavior has been modeled as a Stackelburg game, and we have analyzed the optimal strategies of both subscribers and secondary buyers. From the simulation results, a secondary buyer will tend to buy more power from subscriber increase, a secondary buyer can obtain a larger utility value, and the payment to each subscriber is reduced due to a more severe competition among the subscriber. Nevertheless, the service provider should always offer high quality video stream [12] to prevent the illegal redistribution of video via such itself it has decide the cost. Then only need to forward the content to third parties. This leads to premium Charge for the content owner to maximize his/her total income. The emergence of next generation network (NGN) technologies and increased uptake of bandwidth-intensive applications has led to a surgeon in data traffic. Riding on 3G and 4G technologies, data services are expected to be the key areas for Indian telecom service providers over the next five years. Mobile data traffic in the country is likely to increase nearly hundredfold by 2015 and consumers will stream nearly 600 hours of video content every second.

REFERENCES

[1] G. Gualdi, A. Prati, and R. Cucciara, "video streaming for mobile video surveillance" IEEE Trants. Multimedia, vol. 10, no. 6, Pp.1142-1154, Oct. 2008.

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY
WINGS TO YOUR THOUGHTS…..

[2] H. Ibaraki, T. Fujimoto, and S. Nakano "Mobile video communications techniques and services" in Proc. SPIE, 1995, vol. 2501, p.1024.

[3] D. F. S. Santos and A. Perkusich, "Granola: A location and bandwidth aware protocol for mobile video on-demand systems" in Proc. Int Conf. SoftCom. Design, Sep. 2008, pp.309-313.

[4] ITU global standard for international mobile telecommunications ´IMT-Advanced´, Circular letter, ITU-R March 2008.

[5]ITU (4 July 2002). "IMT-2000 Project - ITU". Retrieved 8 April 2013.

[6] Clint Smith, Daniel Collins. "3G Wireless Networks", page 136. 2000.

[7] Smolic, A., Mueller, K., Stefanoski, N., Ostermann, J., Gotchev, A., Akar, G.B., Triantafyllidis, G., Koz, A. 2007. Coding Algorithms for 3DTV—A Survey, IEEE T Circ Syst VT 17 (11), (Nov. 2007), 1606-1621.

[8] Akar, G.B. Tekalp, A.M. Fehn, C. Civanlar, M.R. 2008. Transport Methods in 3DTV—A Survey, IEEE T Circ Syst VT 17 (11), (Nov. 2007), 1622-1630.

[9] Discussion forum ―3D in the Home: How Close are We? ‖, Stereoscopic Displays and Applications XVIII, San Jose, California, USA, 2007, www.stereoscopic.org.

[10] H. Lee, Y. Lee, J. Lee, D. Lee, and H. Shin, "Design of a mobile video streaming system using adaptive spatial resolution control" IEEE. Trans. Consum. Electron. Vol.55, no. 3, pp.1682-1689, Aug. 2009.

[11] T. Schierl, T. Stock hammer, and T. Wiegand, "Mobile video transmission using scalable video coding" IEEE Trans. Circuits Syst. Video Technol., vol. 17, no. 9, pp. 1204-1217, Sep. 2007.

[12] S. Jumisko-Pyykko and J. Hakkinen, "Evaluation of subjective video quality of mobile devices" in Proc. 13th Annu. ACM Int. Conf. Multi-media, 2005, p.538.

About Authors

D.Sunil final year M.tech Student in Avanthi Institute of Engineering and Technology (JNTUK), Cherukupally, VizianagaramDist, Andhra Pradesh, India.

Mr.B.Madhusudhana Rao working as Asst.prof in the department of CSE in Avanthi Institute of Engineering and Technology (JNTUK), Cherukupally, VizianagaramDist, Andhra Pradesh, India.

Mr. Y Ramesh Kumar obtained his M.Sc (Computer Science) degree from Andhra University. Later he obtained his M.tech (CST) degree from Andhra University. Presently he is working as Associate Professor and Head of the Department (CSE) at Avanthi Institute of Engineering and Technology, Cherukupally, VizianagaramDist. He has guided more than 60 students of Bachelor degree, 40 Students of Master degree in Computer Science and Engineering in their major projects. His Research interest includes Ontology-based Information Extraction based on Web search and mining and ware housing.

Mr.B.Kiran Kumar obtained his M.Tech (I.T) degree from Gitam University. Presently he is working as Associate Professor and Head of the Department (CSE) at Shri Vishnu Engineering College for Women's, Bhimavaram Andhra Pradesh.