A Review on Challenging Issues of Video Streaming Over Heterogeneous Wireless Networks

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ABSTRACT: Video streaming in Heterogeneous Wireless Networks (HWN) has been the tendency of eye-catching feature and a massive impact for past few years among mobile users. It is being involved very huge amount of data in real time implementation and the significant aspect of bandwidth consideration should fluctuate for various kinds of networks that possess real-time multiple interface capability. In this survey, various studies and analysis of different techniques on video streaming issues of Heterogeneous Wireless Networks has been presented. Also this survey focus on analysing different benchmarks for video streaming as rate allocation, bandwidth aggregation, multi user streaming, available bandwidth, link delay, frame lost, throughput, reliability, network congestion and concurrent multipath transfer over heterogeneous wireless networks.

KEYWORDS: Heterogeneous Wireless Networks (HWN), Video Streaming, Bandwidth aggregation, Rate Allocation, link delay.

I.INTRODUCTION

The present wireless cellular networks have mostly outcome with homogeneous mode. The homogeneous cellular networks have essentially base stations or central coordinators and user clients with standard technical characteristics and similar power level profiles. Every base stations employed in the homogeneous cellular network must be equal potential and carefully planned for compatibility. This deployment scenario is much complicated, less flexibility, and high-priced and hence the foremost requirement for video streaming over homogeneous networks is more flexible, less cost-effective and ubiquitous deployment model which must be adept to deliver well of data to destination. These wishes are the principal causes to the advent of heterogeneous networks which exercising base stations similar to homogeneous, but with the specialized advantage of improved spectral efficiency per unit area through concurrent usage of various interfaces. Heterogeneous Networks are essentially made up of existing disparate Radio Access Network (RAN) technologies (e.g. WiMAX, WI-Fi, E-UTRAN). The exploitation of multiple interfaces is capable of increasing the bandwidth. The unreliable characteristics of multiple paths commence new problems in terms of delay owing to probable packet reordering [1]. The basic principle behind many quality aware multipath mechanisms is careful observations at consistent manner and making good decisions without any suspension on each path data handling behaviour. And also, Data traffic management is drawing much attention in multi-path methods [2]. A fast heuristic-based Algorithm with streaming scenarios is designed which is capable of adapting the packet rate and channel bandwidth of the server. This system is analysed to show that rate estimation is not perfect like optimal strategy [3].

Multi user data transfer provides more opportunity for video streaming data with high throughput by parallel processing mechanism. However, the drawbacks of multi user data transfer like various bandwidth limitations of paths, delay of data should cautiously be handled through some mechanisms and synchronize well at the receiving end. If it isn't possible to achieve over video streaming issue, severe confusions would happen that may affect performance level [4]. To overwhelm this problem in multi user environment, some quality aware multi-path data transfer methods can be adapted which schemes are most welcomed and properly utilized by heterogeneous networks for handling well complicated processes such as video streaming in real time applications [4]. Error correction techniques play a significant task in sustaining the video quality over random channels. In case of video transmission some particular

error correction techniques and strategies are used. Many error correction techniques involve the need for further complicated video error correction techniques [5]. For video related data transferring such as video conference, live telecast, the network should co-operate fast traffic. The rest of this article deals with uncertainty issues, rate allocation policies, video packet selection and bandwidth aggregation services of video streaming.

II.VIDEO STREAMING ISSUES

Network Uncertainty over Heterogeneous Wireless Networks

Reliability is a crucial factor for any kind of network for communication purpose. With the help of unchanging progress development of radio communication technologies, there is a need for readily Moved Clients (MC) that should have capable along with multiple connections far at the similar time but not to the same types of Networks. As for achieving a good quality of service by supporting the user's requirements, MCs must get the better inherent features of various wireless technologies. A reasoning design should be made for making more number of possible decisions based on the Network conditions. For each Network a sensitivity observations value and comparison with importance of metrics was derived. For accurate network conditions fuzzy logic techniques can be applied by making use of fuzzy logic tools. MADM Algorithm which is based on fuzzy logic concept that intends to deal with uncertainty and any decision making scheme concerns with the multiple criteria to solve deliberate tentative measures.

Rate Allocation for Video Streaming over Wireless Networks with Heterogeneous Link Speeds

While multiple video streaming sessions are separately transported over a mutual wireless network, cautious rate allocation is needed for well organized exploitation of the network resources, by keep away from network congestion. For this reason a circulated scheme for jamming distortion optimized rate allocation was introduced among multiple video streams. In distributed rate allocation, for a specified wireless channel condition network congestion will enhance with superior allocated rate which directs to packet drop. In contrast, decreasing the allocated rate leads to higher video distortion during encoding. The swapping between average video quality and overall network congestion is optimized, by permitting the cross-layer information exchange between the link state monitors at the MAC layer and the video rate controller at the application layer. As compared to TFRC, the proposed rate allocation scheme benefits from both the video DR characteristics and wireless linkage capabilities.

Loss Tolerant Bandwidth Aggregation (LTBA) for Multi-homed Video Streaming over Heterogeneous Wireless Networks

Bandwidth aggregation is a key research thing in heterogeneous radio Networks ,which increases the throughput and consistency for satisfying the video attribution to the observers. In heterogeneous wireless networks, to overwhelm the burst loss a failure relaxed bandwidth aggregation approach was analysed which deals with path diversity of the networks and also very clever to diminish the successive packet loss beneath burst loss assumption. The analysis is carried out on the view of Gilbert loss design and unbroken stretch of Markovian time chain to sustain the LTBA's back-to-back sending designs. LTBA surpasses the extant attitude for getting better excellence in provisions of PSNR (Peak Signal to Noise Ratio) and it improves the average video PSNR as compared to D-EMS, S-EMS and EDPF. This method guarantee 97 % of the video frames to be delivered within the decoding deadline and can handle the high lossy channel with a loss probability of 40 %.

CMT-QA: Quality-aware adjusting taking place together multipath give property in law in heterogeneous radio Networks

A good trade off Quality-aware concurrent multipath transfer solution can make use of SCTP for FTP like data sending and at the same time real time viewing part of video delivery in heterogeneous radio networks. CMT-QA scrutinizes and observes repeatedly every paths message behaviour ability and formulates data liberation procedure so as to choose the deserved paths . CMT-QA comprises of various progression mechanisms towards transmission of data sharing in networks and also manages the data transfer rate on every path separately. This method aims to moderate the unusable data response by minimizing reallocation delay as well as

redundant retransmissions. The best possible retransmission strategy introduced with CMT-QA discriminates among various kinds of packet loss in addition to the improvement of data delivery efficiency.

Video Packet Selection and Scheduling for Multipath Streaming

As for concerning good quality of video packet delivery and scheduling, multipath streaming is an inevitable criterion. Below   network bandwidth in addition to playback delay restrictions there exist a trouble on preferring the best streaming strategy for deforming the most favourable multipath video delivery. The streaming procedure incorporates the mutual selection of the network path as well as the video packets to be broadcasted, and in the line of their distribution time. By considering the video packet consequences and dependencies among video packets a simple streaming representation was introduced and timing analysis have done to calculate the excellence observed by the receiver intended for a controlled playback delay, as a function of the streaming approach. A paramount problem founded on video concept model, under the assumption that the server can accurately predict the state of the network that had to be derived. For that reason a fast heuristic-based algorithm, which combined together with load-balancing principles was analysed. Also heuristic-based algorithm deals with negligible distortion penalty than common scheduling algorithms, which leads to a very proficient low-complexity multipath streaming for mutually stored and live video services**.**

Multiple Users in Video Streaming over Wireless Heterogeneous Networks

The future trends in wireless networks are waiting to afford good Quality of Services (QoS). Hence a problem of Qos specification should be taken into consideration for multi-user video streaming in excess of multiple wireless heterogeneous networks with the support of cross-layer design with distributed framework structure. By equally weighing up the Source Coding technique and dynamic movement adaptation, this scheme seeks to make best use of the QoS parameters under the confined resource availability. Round Trip Time (RTT) and Available Bit Rate (ABR) are the two principal parameters for framing video. For increasing the video quality by combining rate allocation, the video delivery rate considers distributed   and cross-layer design.

Bandwidth Aggregation (BAG) for Real-Time Applications in Heterogeneous Wireless Networks

Bandwidth utilization is a central theme for network layer architecture and multiple interfaces that facilitate miscellaneous multiple services. The scheduling algorithm in network architecture manoeuvres the data traffic for delivering good QoS requirements when dealing with Bandwidth Aggregation services for real-time considerations. Earliest Delivery Path First (EDPF) algorithm can make use of ensuring packets towards playback deadlines by ordering the packets on the vision of predicted delivery time.

Joint Source Channel Coding (JSCC) and optimization for mobile video streaming in heterogeneous wireless networks

In heterogeneous wireless network environment, video delivery for multiple users when devices are moving from single server is one of the principal issues that are welcomed for multiple interface users. The joint source channel coding (JSCC) can be well utilised under confined bandwidth for single server to single user. So, JSCC should be modified to meet the challenges on adapting multiple user's circumstances. The modification incorporates redundancy evaluation under dealing with huge needs when video data packets are moving forward, flexibility to adapt for delay issues and capable to reduce the distortion at the time of delivery.

A Real-Time Adaptive Algorithm for Video Streaming over Multiple Wireless Access Networks

Video streaming is emerging popularly amongst movable users. The most recent mobile devices, such as smart phones and tablets consist of several wireless network users. In order to make use of multiple links capably and economically to progress video streaming quality further research requirements are needed. By dropping the service cost and to preserve qualified video, the video streaming process was carried out using most recent Markov Decision Process

(MDP). The necessities of quality of service (QoS) for video traffic includes start-up latency, playback fluency, average playback quality, playback smoothness and wireless service cost. To reveal the MDP in real time, an adaptive search algorithm to acquire a sub-optimal result was analyzed and the evaluation of the adaptation algorithm was implemented using a test bed by means of the Android mobile phone and the Scalable Video Coding (SVC) codec.

Cross layer Error-control scheme for Video Quality Support over 802.11b Wireless LAN

Justifying the collision of errors on video quality over wireless network has been a foremost problem which has need of exceedingly capable as well as effectual proposal. The vibrant and diverse scenery of the wireless network involve greatly complicated approach on the way to diminish the impact of broadcast error on video quality. The exchange among delay and video quality ought to be deemed as to intend such applications to rationally sustain video quality in wireless channel. With the intention of decreasing the impact of high error bit and error burst on transmitted video, additional competent error modification scheme are required. Hence an approach by means of forward error correction along with cross layer mechanism was analyzed which dynamically adjusts with the channel condition to improve the loss packets with the aim of boosting the perceived video quality.

V.CONCLUSION

This survey provides various aspects of research issues involved in video streaming over Heterogeneous Wireless Networks and several techniques are addressed to overcome the challenges. But there are still many unresolved issues that should be taken up by future demands. Heterogeneous Wireless Network (HWN) has possessed a lot of research opportunities at various segments of wireless communication particularly in Video Streaming that provide us effective video delivery. Recently researchers in the heterogeneous wireless network domain concentrates on quality of services, frame lost, security, Bandwidth, Handover delay, energy constraints and so many things are being approached at integrated manner for providing effective video communication. However, the fundamental objective of Heterogeneous network operator is to provide effective communication with all users.

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