CENTRALIZED DATA RESOURCE ALLOCATION WITH REDUCED ENERGY CONSUMPTION IN WIRELESS NETWORK

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Abstract — The wireless video multicasting is a best-effort service which consists of limited transmission energy and channel access time. To transmit different resolution videos to heterogeneous clients, a scalable video coding (SVC) is used. Scalable Video Coding system can collect the channel level information and transmission energy by using channel probing. The collected information is used to multicast videos to different clients. Based on the transmission energy and channel condition the resource is allocated and scheduled for to meet quality video. Quality-of-service (QoS) constraint is introduced to reduce the packet loss rate. The multicast scheduling scheme is based on the quality impact of each SVC layer. Using the content-aware multicast scheduling, optimize the resource allocation for each SVC layer sequentially. Depends on the quality of service (Qos) all the node will distribute the data to its neighbor nodes. But it doesn’t meet the better quality because priority is not given for the video quality. In order to achieve the better quality distributed server based communication is proposed in this work. Here all the system video is stored in a centralized device like server. The centralized device will transmit the video to the heterogeneous clients. Here the quality video will be provided based on the Nodes Capacity with consumption of less amount of energy.

Keywords—Scalable video coding, Quality of service,

I. INTRODUCTION

Recent advances in wireless broadband and video coding technologies have made possible pervasive mobile media applications. These applications are also supported by peer-to-peer network architectures such as the wireless mesh networks (WMNs) which offer quick and dynamic deployment of network coverage over a wide geographical area. As mobile devices such as smart phones, tablet PCs and laptops equipped with wireless access capabilities are becoming more popular, they are heterogeneous in term of CPU speed, RAM and storage, display resolution, battery capacity, and connectivity. Scalable video coding (SVC) is being developed in response to the need of robust video delivery for heterogeneous clients. SVC encodes videos into multiple layers which can be judiciously discarded to achieve graceful quality degradation.

More importantly, SVC can cater for multi-resolution demands of heterogeneous clients via a single scalable bit stream, whereby the clients receive and decode different fractions of the video bit stream to obtain the desired resolutions and qualities. On the other hand, the broadcast nature of wireless medium allows the simultaneous transmission of a video packet to multiple receivers. By establishing multicast groups, an SVC bit stream can be streamed to multiple heterogeneous clients who demand different video resolutions. One can exploit the advantage of multicast architecture to deliver scalable videos to multiple clients concurrently. Delay-sensitivity, high-data rate, and unequal priority of scalable video traffics pose challenges to the wireless video transmission. The limited battery life span in each mobile terminal and the scarcity of wireless bandwidth further complicate the streaming of videos over mobile networks. Efficient resource allocation and scheduling for streaming of video over the resource-constrained network remains an open issue. Investigate the problem of multimedia resource allocation and scheduling for SVC multicast over wireless networks. Specifically, we consider the portable wireless terminals with limited power supply.

The SVC multicast is supported with an amount of energy budget. In addition, the SVC multicast is also constrained by the limited channel access due to the competitions from other traffics. Under the resource constraints, we investigate the optimized multicast strategy such that the video quality at the client side is maximized. To this end, there has been rich literature on the related topic briefly introduce some important work next.

II. RELATED WORK

A. Joint Source Adaptation And Resource Allocation For Multi-User Wireless Video Streaming

Multi-user video streaming over wireless channels is a challenging problem, where the demand for better video quality and small transmission delays needs to be reconciled with the limited and often time-varying communication resources. It presents a framework for joint network optimization, source adaptation, and deadline-driven scheduling for multi-user video streaming over wireless
networks. Develop a joint adaptation, resource allocation and scheduling (JARS) algorithm, which allocates the communication resource based on the video users’ quality of service, adapts video sources based on smart summarization, and schedules the transmissions to meet the frame delivery deadlines. The proposed algorithm leads to near full utilization of the network resources and satisfies the delivery deadlines for all video frames. Substantial performance improvements are achieved compared with heuristic schemes that do not take the interactions between multiple users into consideration. The framework for joint network optimization, source adaptation, and deadline-driven scheduling for multi-user video streaming over wireless networks. By exploiting the content diversity of the video users, the network resources can be efficiently used, and the aggregate distortion of the video users can be minimized while meeting the stringent delivery deadlines of the streaming applications.

Performance Evaluation

The proposed algorithms lead to near full utilization of the network resources, and achieve good delivered visual quality with very low bit rate (VLBR) based on content-aware summarization and transcoding schemes, and schedule the transmission of packets to meet individual deadline constraints. The resource allocation is achieved in a distributed fashion based on dual decompositions, while the source adaptation is performed based on content summarization to minimize the delivery distortions. The scheduling is done in a centralized fashion, and requires the mobile users to send frame information to the base station. A feedback mechanism between resource allocation, source adaptation, and scheduling is established to ensure the feasibility of the solution.


Demonstrate the energy-efficient Point Coordination Function (PCF) operation of IEEE 802.11a wireless LAN (WLAN) via both transmit power control (TPC) and physical layer (PHY) rate adaptation. First, we derive the energy-consumption performance analytically for uplink data transmissions under the PCF. From the evaluation results, observe that significant energy savings can be achieved by combining TPC with adaptive PHY rate selection. A key requirement for a transmitter to select the most energy-efficient combination of transmit power level and PHY rate is the knowledge of the path loss between the receiver and itself. Present a novel scheme for accurate path loss estimation in 802.11 WLANs. Results and conclusions presented in this paper can serve as a valuable guidance or reference for the design of future 5 GHz 802.11 WLAN systems.

The objective is to analyze the energy consumption of an 802.11a WLAN device when it is actively transmitting, receiving, or sensing the channel, i.e., when it is not in sleeping mode. The energy consumption is measured in Joule per delivered data bit. Since do not have access to the energy-consumption characteristics of the 802.11a-compliant products currently available in the market, make some assumptions for our analysis based on the power characteristics of two 802.11b-compliant WLAN devices, the Agere ORiNOCO (or formerly LucentWaveLAN) card and the Intersil Prism II card, which are listed in Tables II and III, respectively.

C. Joint source-channel coding and power adaptation for energy efficient wireless video communications [5]

Consider efficiently transmitting video over a hybrid wireless/wire-line network by optimally allocating resources across multiple protocol layers. Specifically, present a framework of joint source-channel coding and power adaptation, where error resilient source coding, channel coding, and transmission power adaptation are jointly designed to optimize video quality given constraints on the total transmission energy and delay for each video frame. In particular, consider the combination of two types of channel coding - inter-packet coding (at the transport layer) to provide
D. Power efficient h.263 video transmission over wireless channels [4]

To introduce an approach for adaptive minimization of the total power consumption of wireless video communications subject to a given level of quality of service. This approach exploits tradeoffs between the power consumption of the H.263 encoder, the Reed-Solomon channel encoder and the transmitter. Simulation results show that source and channel coding parameters and transmit energy per bit should vary based on channel conditions. Optimized settings can reduce the total power consumption by a significant factor compared to fixed parameter settings which do not match with the channel conditions. A Rate-Distortion model for an H.263 compliant coder based on simulation data. The INTRA update scheme forces a macroblock (MB) to be coded in the INTRA-mode after every 1 MBs. The distortion model derived in is: \( D_s(\hat{r};R_s) = \mu(\hat{r}) \) \( R_s + \mu(\hat{r}) + D(\hat{r}) \); (1) where \( \mu = 1 \), \( T \) is the INTRA rate. \( R_s \) is the encoding bit rate in kbits/second and \( D_s \) is the distortion in terms of the mean square error (MSE) per source sample.


Multicast video streaming over multirate wireless LANs imposes strong demands on video codecs and the underlying network. It is not sufficient that only the video codec or only the underlying protocols adapt to changes in the wireless link quality. Research efforts should be applied in both and in a synchronized way. Cross layer design is a new paradigm that addresses this challenge by optimizing communication network architectures across traditional layer boundaries. In this paper we present a cross-layer architecture for adaptive video multicast streaming over multirate wireless LANs where layer-specific information is passed in both directions, top-down and bottomup. Jointly consider three layers of the protocol stack: the application, data link and physical layers. To analyze the performance of the proposed architecture and extensively evaluate it via simulations. The results show that the real-time video quality of the overall system can be greatly improved by cross-layer signaling. Cross-layer optimization is an escape from the pure waterfall-like concept of the OSI communications model with virtually strict boundaries between layers. The cross layer approach transports feedback dynamically via the layer boundaries to enable the compensation for e.g. overload, latency or other mismatch of requirements and resources by any control input to another layer but that layer directly affected by the detected deficiency. In the original OSI networking model, strict boundaries between layers are enforced, where data are kept strictly within a given layer. Cross-layer optimization removes such strict boundaries to allow communication between layers by permitting one layer to access the data of another layer to exchange information and enable interaction. For example, having knowledge of the current physical state will help a channel allocation scheme or automatic repeat request (ARQ) strategy at the MAC layer in optimizing tradeoffs and achieving throughput maximization.

III. EXISTING SYSTEM

The optimal resource allocation and scheduling method can be considered for wireless network. By using scalable video coding the video is multicast to the client with temporal and quality scalabilities. Here the problem is a joint optimization of the selection of modulation and coding scheme and the transmission power allocation. The solution at each step takes into account of the channel condition remaining resources and client requirements. Video coding is being developed in response to the need of robust delivery for heterogeneous. It encodes videos into multiple layers which can be discarded to the clients. SVC bit stream is used to transmit a encoded layers to multiple clients who demand different video resolutions. It does not meet the quality video and less consumption of energy because the resource is not allocated and scheduled properly. The existing algorithm address only which route and when to transmit a video packet in network. It doesn’t do the multicasting with scheduling manner. Its not considering the system energy level while multicasting. Energy consumption is not distributed in whole network.

Limitations
- Fading, data-dropping in wireless network.
- They didn’t maintain any scheduling method, while multicasting.
- Resource allocation method depends on source system that may give negative results also.

IV. PROPOSED SYSTEM

To achieve the better quality distributed server based communication is proposed in this work. In this all the system video is stored in a centralized device. The device acts likes a server. This can collect the system video simultaneously. The

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centralized device will transmit the video to the heterogeneous clients. The multicasting can be done with scheduling manner. Scheduling has to be based on all the system in the network. Resource allocation have to implement based on all the systems and its energy level. Here the quality video will be provided based on the Nodes Capacity with consumption of less amount of energy. 

Module Description

a. Network Design and neighbour updation
This is describing about to design the network and going to implement the Concept. In this each and every node was placed in its desired place and also defined that each node had a unique data and different capacity. In this network each nodes data have to share to all the other nodes. Initially first made a broadcasting operation to update its neighbor. By that updating each node will be able to identify its neighbor and non-neighbor nodes. By use this updating only routing paths will be find for future communication operation. And also did another one operation here which was sharing information. By this message each node will able to find that what its neighbor node stored itself. These all about The first module.

b. Implement of Resource allocation based on system and its energy-level
In this module all the systems will going to update its neighbor. In that timing all the nodes are sent message about itself and what it had and what type of quality it had. Because of this message all the nodes will get aware of all the nodes in network.

c. Multicasting Scheduling based on all the nodes in network to share the data
This module is about to select a node which going to multicast a data in network as a distributed manner. Because of this multicasting, a particular data will stay along anywhere in the network. After that give a input, that is for getting a particular data from anywhere in a network.

d. Comparison of two methods
This module is used to display the difference between existing and proposed method. Then this output displayed in graph. So it’s easy to analysis transmission performance.

VI. CONCLUSION & FUTURE WORK

The optimized multicast strategy is to maximizes the video quality under the resource constraints. Experiment results show that notable video quality improvements for all clients can be achieved when compared to the state-of-the-art video multicast method. The existing system and its problems are extracted from the literature survey. The proposed system extends to transmitting video based on centralized device. The centralized device collect the data from the system. From that video transmitted to heterogeneous client. It consumed less amount of energy and meet quality video.

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