Hyper spectral Video Data across Wimax Networks

Dr. T. Arumuga Maria Devi , V. Senthilkumar
Assistant Professor & Student
Centre for Information Technology and Engineering
Manonmaniam Sundaranar University, Tirunelveli - 627 012.
Tamilnadu, India.

Abstract

In this paper, we propose a novel scalable video broadcast/multicast solution, SV-BCMCS, that efficiently integrates scalable video coding my project is optimal resource allocation problem for scalable video multicast in 3G networks. We show that the system-wide video quality can be significantly increased by jointly assigning the channel resources for enhancement layers. Our solution strikes a good balance between the average and worst-case performance for all viewers in the cell. An efficient helper discovery scheme for viewers to obtain additional enhancement layers from their ad-hoc neighbors a few hops away. Also a multi-hop relay routing scheme is designed to exploit the broadcast nature of ad-hoc transmissions and eliminate redundant video relays from helpers to their receivers.

Keywords : Hyperspectral video data, across wimax networks

Introduction

Mobile communication allows transmission of voice and multimedia data via a computer or a mobile device without having connected to any physical or fixed link. Mobile communication is evolving day by day and has become a must have for everyone. Mobile communication is the exchange of voice and data using a communication infrastructure at the same time regardless of any physical link. Mobile communication technologies not only benefiting businesses to perform their operation faster and efficiently but also raising the standard of human lives. Mobile communication or mobile computing is just the two different names for the ability to use the mobile technology while on the move, most of the portable computers and computing equipment which are particular for the use in stationary place or configuration.

WIMAX (Worldwide Interpretability for Microwave Access) is a wireless communications standard designed to provide 30 to 40 megabit-per-second data rates,with the update providing up to 1 Gbit/s for fixed stations. The forum describes WiMAX as "a standards based technology enabling the delivery of last mile wireless broadband access as an alternative to cable. IEEE 802.16 (WiMAX) is an emerging last mile technology for broadband wireless access .Compared with 3G cellular networks and IEEE 802.11 Wi-Fi, it has better coverage and throughput. As the capacity of mobile devices improves, many multicast applications, such as wireless IPTV, Radio over IP, Video conferencing, and etc., are developed. Third Generation Partnership Project 2 (3GPP2) for providing broadcast/multicast service in the CDMA2000 setting. However, most existing BCMCS solutions employ a single transmission rate to cover all viewers, regardless of their locations in the cell. Such a design is sub-optimal. Viewers close to the base-station are significantly “slowed down” by viewers close to the cell boundary. The system-wide perceived video quality is far from reaching the social-optimum.

SYSTEM ANALYSIS

EXISTING SYSTEM

The system-wide video quality can be significantly increased by jointly assigning the Most existing solutions for video Broadcast Multicast Services (BCMCS) in 3G networks employ a single transmission rate to cover all viewers. The system-wide video quality of the cell is therefore throttled by a few viewers close to the boundary, and is far from reaching the social-optimum allowed by the radio resources available at the base station

As the capacity of wireless communication improves, several multicast applications like video conferencing and iptv have been developed. An important issue in these multicast applications is improving bandwidth utilization. In multicasting same data is transmitted to multiple subscriber stations. We can achieve this data transmission using unicasting also, but it requires difference channel to be established BS and SS. But in the case of multicasting a single channel can be used to transmit the data to different users as long as channel strength is good. Since SS has different bit error rates due to heterogeneous channel connection, all SSs in multicast tree requires different resource to receive same data. Adjustment the resource distribution will increase number of served SSs and improve resource utilization is difficult for multicasting. In WiMAX relay network in addition to MR-BS multiple RS are included to improve coverage distance. Since the inclusion of relay stations will increase the complexity of improving multicast resource utilization is less.

ADVANTAGE:

- Traditionally, computationally complex transcoders are used by video servers to reduce the video coding rates in order to guarantee on time delivery of video data.

DISADVANTAGE

- However, in a hybrid network, real-time transcoding is not feasible on resource-constrained mobile devices, and thus we employ scalable videos for in-network video adaptation.

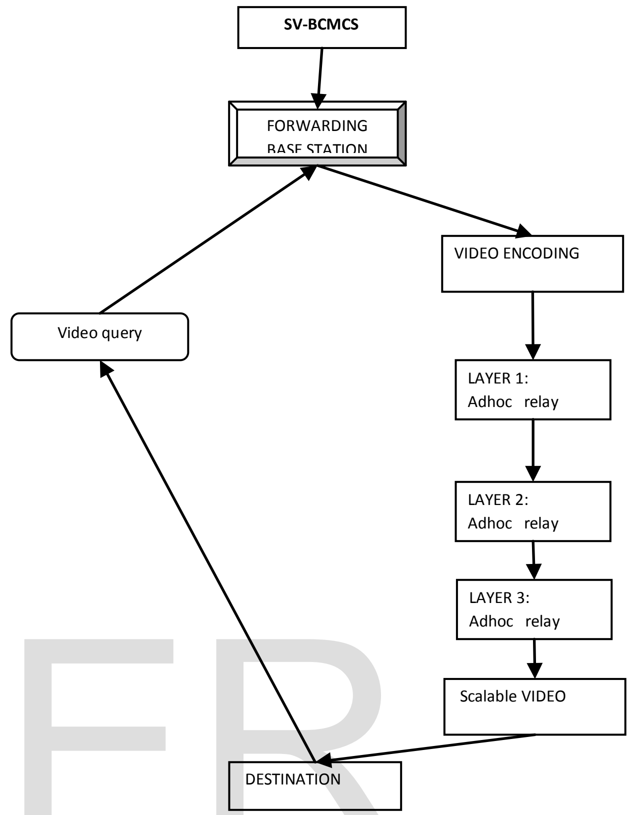
PROPOSED SYSTEM

wimax multihop-relay network, in addition to a base station, multiple relay stations are used for enhancing the throughput, and improving the coverage distance of the base station. Multicasting is a more efficient method of supporting group communication than unicasting, as it allows transmission and routing of packets to multiple destinations using fewer network resources. Instead of enumerating all the possible choices to find the globally optimal solution, the proposed BGWA greedily makes the locally optimal choice based on the weighted value In our solution, video is encoded into one base layer and multiple enhancement layers using scalable video coding (SVC). WiMAX network comprises a base station (BS) and multiple subscriber stations (SSs) . The BS serves as a gateway to the wired network, while all SSs connect to the BS to access the Internet. However, under the IEEE 802.16j standard , a new type of infrastructure node called relay stations (RSs) is introduced. RSs forward data between the BS and the SSs both upward and downward to improve the system capacity and throughput. As the capacity of mobile devices improves, many multicast applications, such as wireless IPTV, Radio over IP, Video conferencing, and etc., are developed. The channel resources/bandwidth of the enhancement layers are optimally allocated to maximize the system-wide video quality given the locations of the viewers and radio resources available at the base station. In addition, we allow viewers to forward enhancement layers to each other using short-hop and high-rate ad-hoc connections.

ADVANTAGE

- Our solution strikes a good balance between the average and worst-case performance for all viewers in the cell.
- Multicast applications is improving bandwidth utilization.

SYSTEM ARCHITECTURE FOR PROPOSED SYSTEM:



Scalable Multicasting in Mobile Ad Hoc Networks

Multicast, LGT(Location Guided Tree construction algorithms and RDG (Route Driven Gossip).

In this paper, we study the relationship of the protocol state management techniques and the performance of multicast provisioning. For performance, we focus on protocol control overhead and protocol robustness. We are further interested in the following two questions.

1) Will the state constraining methods successfully reduce the protocol control overhead?

2) When the multicast service scales up vertically (in terms of the group size) and horizontally (in terms of the number of groups), how the scalability will impact the protocol performance?

In order to better address these questions, we present two hierarchical multicast routing solutions for MANETs. The first solution, termed as domain-based hierarchical routing, divides a large multicast group into sub-groups, each with a node assigned as a sub-root. Only the sub-roots maintain the protocol states, and are selected on the basis of topological optimality. Thus, we can have a more flexible control on the protocol state distribution. The second solution, termed as overlay-driven hierarchical routing, has a different way of building multicast hierarchy. Using overlay

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multicast as the upper layer multicast protocol, and stateless small group multicasts as lower layer multicast protocol, this hierarchical multicast solution achieves protocol robustness, as well as efficient data delivery. These features make overlay multicast approach more suitable for the MANET environment.

ADVANTAGE

channel resources for enhancement layers. Our solution strikes a good balance between the average and worst-case performance for all viewers in the cell. protocols, such as MCEDAR and protocols reported in use another state constraining method. Only a selected subset of nodes which form the virtual backbone of the network get involved in routing. Thus protocol states are combined within the virtual backbone. The stateless multicasting protocols

- The simulation results have demonstrated the performance benefit, enhanced scalability, and low overheads associated with the proposed techniques.
- A comparative study of variations of our techniques is also presented and the relative merits of these techniques for different mobility and size of MANETs are analyzed.

Disadvantage

- To develop a light-weighted but reliable multicast protocol for small groups.

It can be applied to the upper level multicast in the routing hierarchy to achieve better reliability in packet delivery

System Architecture

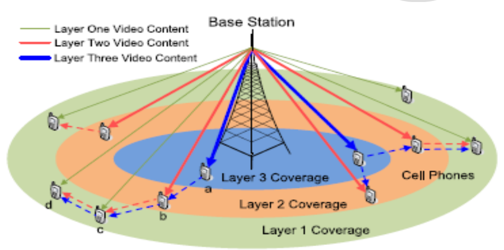
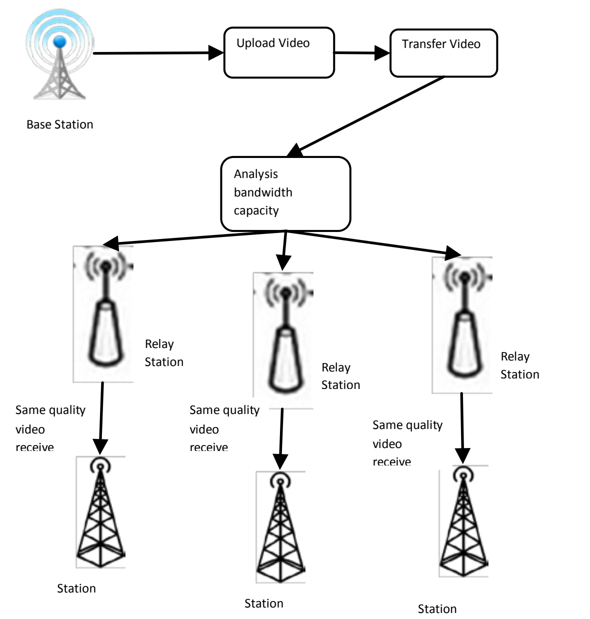


Fig. 1. Architecture of SV-BCMCS over a hybrid network (assuming three layers of video content).

FIGURE 6.1: System Architecture

In SV-BCMCS, through SVC coding, video is encoded into one base layer and enhancement layers. Viewers who receive the base layer can view the video with the minimum quality. The video quality improves as the number of received layers increases. An enhancement layer can be decoded if and only if all enhancement layers below it are received. The multicast radio channel of the base station is divided into multiple sub-channels. Here a sub-channel stands for either a temporal or frequency division of the bandwidth. Different layers of video are broadcast using different sub-channels with different coverage ranges.



To maintain the minimum quality for all viewers, the base layer is always broadcast using a sub-channel to cover the entire cell. To address the decoding dependency of upper layers on lower layers, the broadcast range of lower layers cannot be shorter than that of the higher layers.

MODULES DESCRIPTION

Network Settings Module

It is assumed that all multicast users/nodes have two wireless interfaces: one supports a channel for video service, and the other supports for ad-hoc data relay. The data rate of the ad-hoc network is set .

Scalable Video Setting

To provide the basic video service to all viewers, the base layer is always broadcast to the entire cell. The transmission ranges of the enhancement layers are optimally allocated to maximize the system-wide video quality given the location of the viewers and radio resources available at the base station. We develop analytical models to study the expected gain of few-hop ad-hoc video relay under random viewer distribution

Analysis relay station

Since each node has different channel qualities, the, i.e., acceptable modulation schemes and transmission rates may vary; therefore, it takes different amounts of resource for a sender to transmit a stream to different recipients. We define the resource requirement of are receiver as the total amount of resource required to receive the stream. If an SS needs an RS to relay the stream, the resource requirement includes the resource for transmitting.

Multicast Data Transfer

Request Phase

This phase starts when a source node, which is not a group member, wishes to join the group. It invokes a route discovery procedure towards the multicast group, through broadcasting a Join-request packet to neighbors. This packet contains the ID of the source node in a Source ID field, the multicast group ID in a Destination ID field, and a Sequence number field set by the source node. To eliminate the possibility of receiving multiple copies for a Join-request, each

node receiving a Join-request detects duplication through checking its multicast message duplication table. The major mismatch arises in the means of applying the source routing concept, which accumulates in the Join-reply packet during the reply phase instead of accumulating in the request phase. Thus, we eliminate channel and routing overhead.

Reply Phase

Initially, a multicast receiver initiates the reply phase. A multicast receiver, when receiving a Join-request packet, first checks for stability among its neighbors including associativity ticks, signal strength, and link availability. Battery life is also checked considering consumed power needed to transmit to each neighbor. When these metrics satisfy predefined thresholds, the receiver selects the neighbor as FG node and sets it as a member in the Neighbor_Stability_Table.

Ad-hoc Video Relay

In a pure SV-BCMCS solution, users closer to the base station will receive more enhancement layers from the base station. They can forward those layers to users further away from the base station through ad-hoc links. Ad-hoc video relays are done in two steps: 1) each user finds a helper in its ad-hoc neighborhood to download additional enhancement layers; 2) helpers merge download requests from their clients and forward enhancement layers through local broadcast.

Evalute analysis

The SV-BCMCS routing protocol runs after the greedy helper selection protocol and the optimal radio resource allocation. Assuming optimal radio resource allocation has been performed, the base station decides to transmit the layers with different rates. It will broadcast this information to every node in the cell. Moreover, in the greedy helper discovery phase, each node obtains the information for all the relay paths to which it belongs.

Hyper Spectral Video Data Experimental Result

bailey.mpg

tracking.mpg

CONCLUSION AND FUTURE WORK

A novel scalable video broadcast/multicast solution that efficiently integrates scalable video coding, 3G broadcast and ad-hoc forwarding is proposed. I have formulated the resource allocation problem for scalable video multicast in a hybrid network whose optimal solution can be resolved by a dynamic programming algorithm. Efficient helper discovery and video forwarding schemes are designed for practical layered video/content dissemination through ad-hoc networks. Furthermore, I analyze the effective distance gain enabled by ad-hoc relay, which provides insight into the video quality improvement made possible by using ad-hoc data relay. In the future, we will consider supporting relay networks with more hops. We will also try integrating the resource allocation scheme with scheduling algorithms and call admission control scheme to develop an integral resource allocation scheme for wireless relay networks.

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AUTHORS

1. Assistant Professor Dr. T. Arumuga Maria Devi Received B.E. Degree in Electronics & Communication Engineering from Manonmaniam Sundaranar University, Tirunelveli India in 2003, M.Tech degree in Computer & Information Technology from Manonmaniam Sundaranar University, Tirunelveli, India in 2005 and Worked as Lecturer in department of Electronics & Communication Engineering in Sardar Raja College of Engineering and also received Ph.D Degree in Information Technology – Computer Science and Engineering from Manonmaniam Sundaranar University, Tirunelveli , India in 2012 and also the Assistant Professor of Centre for Information Technology and Engineering of Manonmaniam Sundaranar University. Her research interests include Signal and Image Processing, Multimedia and Remote Communication.

2. **V.Senthilkumar a is an M.Tech student** in Computer and Information Technology , Centre for Information Technology and Engineering of Manonmaniam Sundaranar University.

M.Sc.,(IT) (2012) from Lovely Bharathidasan University, Trichy.

E-mail: vsenthilkumarmtech@gmail.com