Scalable Video Streaming Over Wireless Access Networks

Shanmuga Priya,* Abhishek Puhan, Nitin Punia, Rahul Nirmal
Department of Computer Science and Engineering,
Vel Tech High Tech Dr.Rangarajan Dr.Sakunthala Engineering College, Avadi, Tamil Nadu
***Corresponding author: E-Mail: spriyavasan@yahoo.co.in**

ABSTRACT

In this paper, discussed about, classification of video traffic that provides self adaptive streaming with the advantage of QoS. It shows how a mobile phone can able to stream the videos that is incompatible in the particular devices with almost no buffering and to provide efficient streaming services of multimedia for varying bandwidth environments. The main idea of this paper is to change the video codes of the multimedia based upon the configuration of the mobile devices, when receiving the hardware and network environment parameters.

KEY WORDS: Video streaming Server (VSS), Streaming Video Conversion (SVC).

1. INTRODUCTION

Cloud based multimedia services provide a capable, scalable, and flexible data processing or operational methods and also offer an elucidation for the customer's demands of high quality and diversify multimedia. Accessing multimedia video services through networks is now nota problem. The major video platforms, such as YouTube and Amazon, have good management styles and provide users to share multimedia videos easily with different services. It is not important what the service is, users will always expect powerful, sound and stable functions. For multimedia videos, stability is one of the greatest important requirement.As smart or intelligent mobile phones and also wireless networks become more and more well liked, network services for users are no longer restricted to the houses.Multimedia information can be retrieved easily using mobile phones, allowing users to enjoy anywhere network services. In this paper, the restricted bandwidth available for mobile streaming and variety of devices desires, presented a device-aware and network Quality of Service (QoS) approach which provides multimedia data acceptablefor a unit environment through interactive mobile streaming services, after considering it the entire network domain and adjusting the interactive dispatched frequency and the vigorous multimedia trans coding, to avoid the waste ofbandwidth and terminal power. In this paper, they realised the probability and to provide self-adaptive multimedia streaming services.

Literature Survey:

On Monitoring and Controlling QoS Network Domains: Media cloud provides a cost-effective and more powerful answer for the coming tide of the media usage. Based on previous information of the recent work on media cloud research, in this part, they first make some suggestions on how to make the media cloud, and then propose some potentially promising topics for coming time research.

Accumulated QoS Mapping Framework for Relative Service Differentiation-Aware Video Streaming: This article introduces the principal concepts of multimedia cloud computing and represents a novel framework. They addresses multimedia cloud computation fromthe cloud that has multimedia (media cloud) and cloud-aware multimedia (cloud that media) perspectives. Initially, they shown a multimedia-aware cloud, which directs how a cloud can perform distributed multimediacalculations and storage and also provide quality of service (QoS) provisioning for multimedia services. To achieve a high QoS for multimedia services, they propose a media-edge cloud (MEC) architecture, in which storage, central processing unit (CPU), andthe graphics processing unit (GPU) clusters is presented at the edge to provide distributed parallel processing and QoS adaptation for variety of devices.

Behaviour Signature for Fine-grained Traffic Identification: They planned to carry out a validation and a through experimental assessment of the presentation ofthe cross-layer construction as soon as its development will be finished. In addition, they would like to enlarge their study on this class of architectures to check the impact of dependability issues, such as security and fault tolerance, on their design.

Distributed Scheduling Scheme for Streaming of Video over Multi-Channel Multi-Radio Multi-Hop Wireless Networks: In the paper, they have developed fully distributed planning method that jointly solve the routing problems, fairness,rate allocation and channel-assignment for video streaming or playing over multiple channels multi-radio networks. Unlike conventional mechanism techniques focus on optimal system throughput or scheduling efficiency, their work aims at achieving minimum video malformation and certain unfairness by cooperatively considering media-aware distribution and network resources allocation. Excessive similar results are provided which indicates or tells the success of our proposed schemes.

Measurement, Modelling, and Analysis of a Peer-to-Peer File-Sharing Workload: In this paper, they propose a group-based cloud node selection procedure for communication-rigorous cloud applications. By gaining or taking advantage of the clustering analysis, theapproach not only examines the QoS parameters of cloud nodes, but also considers the relationships (*i.e.*, response time) between othercloud nodes. Their approach is systematically combines cluster analysis and ranking methods. The investigational results display that the approach performs the existing ranking approaches.

System Architecture: The system architecture shows how the project works. Basically the work flow starts with a user that uses mobile phone device to login the site that have multimedia through android application. After the login process the server will observe the mobile configuration like version, phone type, network operator, network type etc. At the time of selecting a multimedia a phone actually gives its hardware and network environment parameters to the profile agent (admin) in the server, which accounts the mobile device codes and governs the parameters. Then the codes is transmits to Video Streaming Server (VSS).

The Video Streaming Server (VSS) used for SVC Code in order to produce SVC Transcoding Controller (STC) and parameters for the device via map-reduce to the server in order to increase the transcoding rate. After this by using the codes specifically for that device the video will be streamed without buffering and even in the bad network situations.

The Fig.1, shows the architecture of the system of this project. It has two modules one is server side and other is client side. When user try to login the profile verification is done by profile agent, after this the various parameters is checked in server side and based upon those parameters the videos codes is generated through Streaming Video Conversion(SVC). After getting video codes, mapping and reducing function is done to provide better quality of video to the user.

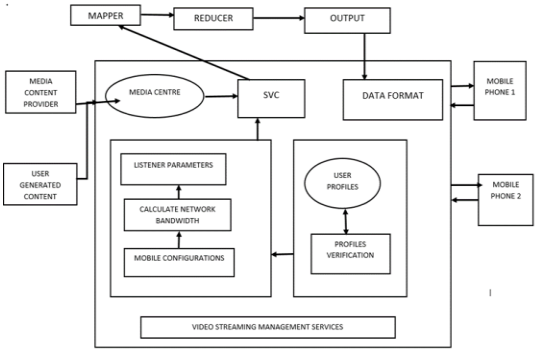

Figure.1. System Architecture

Implementation:

User Profile Module: The profile agent (admin) is used to receive the mobile hardwareand network environment parameters and create a user profile. The mobile phone device transfers its hardware specifications in XML format to the profile agent (admin) present in the cloud server. The XML-schema is a kind ofmetadata, which is mainly semantic and helps in describing the data format of the file. The metadata allows those who do not have account or non-owner users to see information about the files, and their structure is extensible. However, any mobile phone device that is using this cloud service for the first time will be unable to provide such a profile, so there will be an additional profile examination to provide the test performance of the mobile phones and sample relevant information. Through this function, the mobile phones can generate or produce an XML-schema profile and transmit it to the profile agent (admin) for further examination and verification. The profile agent determinesthe required parameters or values for the XML-schema and generates an user profile, and then transfer the profile to the DAMM for identification.

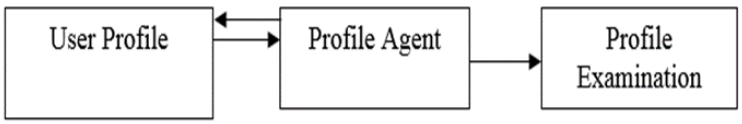

Figure.2. User Profile Module

Web service Connection: When web based methods are invoked from inside Android application, the application retrieve the data from the server in the form of XML. The response which has been collected can be examined and rendered in the application as needed. SOAP (Simple Object Access Protocol) is a protocol specification for interchanging structural information in the accomplishment of Web Services in different computer networks.

Bandwidth Estimation: The main concept for NDAMM is to regulate the interactive transmission frequency and the SVC multimedia coding parameters or values of the mobile phones according to the parameters. It gives these parameters to the STC (Scalable Trans Controller) for transcoding control, so to minimize the communication bandwidths requirements and meet the mobile phone device user's demand for multimedia or video streaming. It comprises ofa parameter profile module, a network estimation module, a listen module, a device-aware Bayesian prediction method, and adjustable multi-layer selection. The interactive multimedia streaming assistance should receive the user profile of the registered mobile device through the listen module. The parameter profile module records the user profile and regulates the best parameters. This would be provided to both of the network estimation module and thedevice-aware Bayesian prediction module and also predict the required numerical values. Rh and Rw represent the height and width of the bearable resolution for the device, CPavg and CP represent theaverage and present CPU calculating speed. Db and Db rate represent the existing energy of the mobile phone devices and energy

consumption rate of mobile phones, and BW, BWstd, and BWavg represent the existing, average and standard deviation values of the bandwidths. When this parameter form is preserved, then the values or parameters can be transferred to the device-aware Bayesian prediction module and the network estimation module for relatedpredictions.

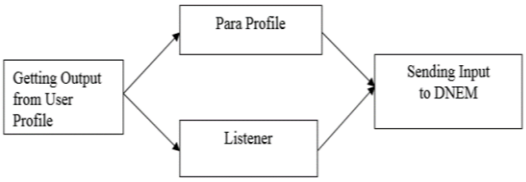

Figure.3. Bandwidth Estimation **Figure.4. Examining the User**

Scalable Video Conversion: The DNEM is mainly established on the measurement-based prediction concepts; however, it further develops or generates the EWMA (Exponentially Weighted Moving Average).The Exponentially Weighted Moving Average uses the weights of the historical data or previous data and the current observed values to computeflexible and gentle network bandwidth data for the dynamic adaptation of weights.

In order to determine or to obtain the precise network bandwidth values, the EWMA filter determinesthe network bandwidth valuesin which is the estimated bandwidth of the No "t" of time interval. For different mobile network estimations, this module which is used for error correction of estimation and the overall standard difference and estimated the different bandwidths by balancing the weights among which, is thestandard deviation weight and the moving average weight. When the prediction error is greater than, the system shall reduce the weight modification of the predicted difference; relatively, when the predicted errors are less than, the system shall strengthen the weight modification of the predicted differences. When the changed bandwidth of the system is more than or larger than the standard difference, the predicted weight will increases as the corrected value of standard deviation is reduced. The predictor formula for the overall mobile network quality uses the standard normal state value range concept of plus-minus three times the standard deviations of statistics, referring to recognize the stable or unstable state of the present mobile network. If the present mobile network is in a stable state, it shall conform to the following calculations among which, is the coefficient of the evaluated standard deviation. The value is almost 1.128.

If the network bandwidth values of this time cycle is within plus-minus three times the standard deviations of the standard value, the present mobile network will be in a stable state; otherwise it would be in a fluctuating state.

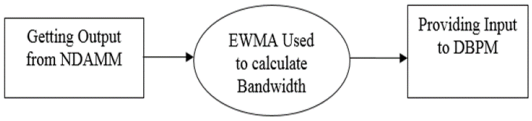

Figure.5. Calculation of Bandwidth for conversion

Streaming: The SVC hierarchical structure provides features like scalability of the spatial, temporal and quality dimensions. It adjusts together with the FPS, resolution and video variations of a streaming bitrate: however, the question remains in mind that how to choose an appropriate video format based on the available resources of various devices. Hereby, in order to comply with the real-time requirements of mobile multimedia, this study adopted Bayesian theory to retrieve orto infer whether the video features conformed to the decoding actions.

The inference module is based on the following two conditions:

- The LCD brightness or contrast does not always fluctuate. This postulate aims at a hardware energy estimation. The literature states that TFT LCD energy consumption accounts for about 25% – 45% of the total power for different terminal hardware environments. Although the overall power consumption can be reduced effectively by adjusting the LCD, with multi-media services, users are very much sensitive to brightness; they dislikebrightness of the video that repeatedly changes. As changing the LCD brightness will affect the energy consumption evaluation values, the LCD brightness of the mobile phone is assumed to not able to changeduring multimedia service.
- The energy of the mobile phone shall be adequate enough for playing a full multimedia video. The full multimedia service must be adequate to last until the user is satisfied. This assumed state is also the next main decision rule. As for the three video parameters of bit rate, Frames Per Second andresolution, the bit rate depends upon the frame rate and resolution, so the Bayesian network acquires the frame rate and resolution as the video input features and uses the bit rate as parameter considered.

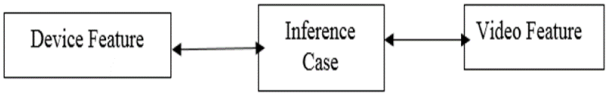

Figure.6. Streaming of Video

Working Screenshots: Here are some working screenshots of the model and they are shown below:

Login Screen: This page will be shown after clicking the Network Qos application. In this page user will get two option one is sign in and signup. User can select any one option. For new user, user need to give details

Figure.7. Log in Screen

Mobile Information Retrieval: Here after clicking the get mobile information the system will generates the details of the mobile phone.

Figure.8. Mobile information retrieval

List of Video: This page will represent the list of video present in the server.

Figure.9. List of Video

Streaming Of Video: In this the selected video will be streamed on mobile based upon its configuration.

Figure.10. Streaming of Video

2. CONCLUSION

By investigating different QoS service classes and QoS related features of popular video traffics, this paper finds that downstream/upstream rates of traffic appear to be good features to classify Internet video traffic. Based on considerable statistical analysis of typical video traffics captured in live network, this paper defines a new set of QoS classes according to difference in downstream/upstream rates. To effectively classify video traffic based on new QoS classes, we construct a bag-QoS-words model as the set of specific QoS local patterns that may be expressed by core QoS features. In accordance with updated or a modified K-SVD, Internet traffic can be classified in to corresponding QoS class with a SVM classifier. Experimental results demonstrate the practicability of the proposed method.

In future work, we will collect more video traffic data and would study the potential QoS pattern for more existing video applications.

REFERENCES

Kamal Gakhar, Mounir Achir, Annie Gravey, How many traffic classes do we need in WiMAX, IEEE Wireless Communications and Networking Conference, Hong Kong, China, 2007, 3706–3711.

Li Qun, Zhang Honggang, Guo Jun, B. Bhanu, An Le. Reference-Based Scheme Combined With K-SVD for Scene Image Categorization, IEEE Signal Processing Letters, 20 (1), 2013, 67-70.

Mehdi Alasti, Behnam Neekzad, Jie Hui, Rath Vannithamby, Quality of service in WiMAX and LTE networks, IEEE Communications Magazine, 48 (5), 2010, 104-111.

Natalia M, Markovich, Udo Krieger R, statistical analysis and modeling of peer-to-peer multimedia traffic, Next Generation Internet, LNCS 5233, Springer-Verlag Berlin Heidelberg, 2011, 70-97.

Sumit Maheshwari, Sudipta Mahapatra, Kumar C.S, Vasu K, A joint parametric prediction model for wireless internet traffic using Hidden Markov Model, Wireless Networks, 19 (6), 2013, 1171-1185.

Sung-Ho Yoon, Jun-Sang Park, Myung-Sup Kim, ChaeTae Lim, JunHyung Cho. Behavior signature for big data traffic classification, International Conference on Big Data and Smart Computing (BIGCOMP), Chatrium Hotel Riverside Bangkok, Thailand, 2014, 261-266.

Wang Zai-jian, Yu-ning Dong, Xinheng Wang, A Dynamic Service Class Mapping Scheme for Different QoS Domains Using Flow Aggregation, IEEE Systems Journal, 99, 2014, 1-12, 2014.

Yanjiao Chen, Kaishun Wu, Qian Zhang. From QoS to QoE, A Tutorial on Video Quality Assessment, IEEE Communications Surveys & Tutorials, 17 (2), 2015.

Zhang Jun, Chen Chao, Xiang Yang, Zhou Wanlei, Xiang Yong. Internet Traffic Classification by Aggregating Correlated Naive Bayes Predictions, IEEE Transactions on Information Forensics and Security, 8 (1), 2013, 5-15.