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INTERNET VIDEO TRAFFIC CLASSIFICATION AND TRANSFER ACROSS DISTRIBUTED NETWORK IN VIDEO STREAMING

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Abstract: Video streaming is gaining popularity among mobile users. The latest mobile devices, such as smart phones and tablets, are equipped with multiple wireless network interfaces. How to efficiently and cost-effectively utilize multiple links to improve video streaming quality needs investigation. In order to maintain high video streaming quality while reducing the wireless service cost, in this paper, the optimal video streaming process with multiple links is formulated as a Markov Decision Process (MDP). The reward function is designed to consider the quality of service (QoS) requirements for video traffic, such as the startup latency, playback fluency, average playback quality, playback smoothness and wireless service cost. To solve the MDP in real-time, we propose an adaptive, best-action search algorithm to obtain a sub-optimal solution. To evaluate the performance of the proposed adaptation algorithm, we implemented a tested using the Android mobile phone and the Scalable Video Coding (SVC) codec. Experiment results demonstrate the feasibility and effectiveness of the proposed adaptation algorithm for mobile video streaming applications, which outperforms the existing state-of-the-art adaptation algorithms.

Keywords: NetBeans, QoS, SVC (Scalable Video Coding), MDP, STC, NDAMM, DNEM, Multi-device communication

I.INTRODUCTION

Cloud multimedia services provide a capable, flexible, and scalable data processing method and offer a elucidation for the user demands of high quality and diversify multimedia. Generally speaking, accessing multimedia video services through networks is no longer a problem. The major video platforms, such as Youtube and Amazon, have good management styles and provide users to share multimedia videos easily with diversified services. No matter what the service is, users will always expect powerful, sound and stable functions. For multimedia videos, stability is of the greatest importance. To develop multimedia services provide a capable, flexible, and scalable data processing method and offer a elucidation for the user demands of high quality and diversify multimedia. As intelligent mobile phones and wireless networks become more and more popular, network services for users are no longer limited to the home. Multimedia information can be obtained easily using mobile devices, allowing users to enjoy everywhere network services.

As intelligent mobile phones and wireless networks become more and more popular, network services for users are no longer limited to the home. Multimedia information can be obtained easily using mobile devices; allowing users to enjoy everywhere network services. Considering the limited bandwidth available for mobile streaming and different device desires, this study presented a network and device-aware Quality of Service (QoS) approach that provides multimedia data suitable for a workstation unit environment via interactive mobile streaming services, further considering the overall network environment and adjusting the interactive transmission frequency and the dynamic multimedia transcoding, to avoid the waste of bandwidth and terminal power. Finally, this study realized a prototype of this architecture to validate the probability of the proposed method. According to the experiment, this method could provide efficient self-adaptive multimedia streaming services for varying bandwidth environments.

Cloud Computing:

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts remote services with a user's data, software and computation.

There are many types of public cloud computing:

- Infrastructure as a service (IaaS)
- Platform as a service (PaaS)
- Software as a service (SaaS)
- Storage as a service (STaaS)
- Security as a service (SECaaS)
- Data as a service (DaaS)
- Test environment as a service (TEaaS)
- Desktop as a service (DaaS)
- API as a service (APIaaS)

The business model, IT as a service (ITaaS), is used by in-house, enterprise IT organizations that offer any or all of the above services.

Using software as a service, users also rent application software and databases. The cloud providers manage the infrastructure and platforms on which the applications run. End users access cloud-based applications through a web browser or a light-weight desktop or mobile app while the business software and user's data are stored on servers at a remote location. Proponents claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and enables IT to more rapidly adjust resources to meet fluctuating and unpredictable business demand.

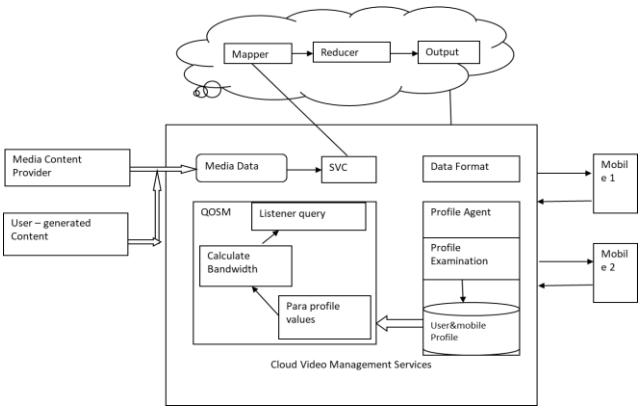
Android:

It is a free, open source mobile platform. Linux-based, multi process, Multithreaded OS. Android is not a device or a product It's not even limited to phones You could build a DVR, a handheld GPS, an MP3 player, etc.Android is a software stack for mobile devices that includes an operating system, middleware and key applications. Android includes a set of C/C++ libraries used by various components of the Android system. These capabilities are exposed to developers through the Android application framework

The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Makes mobile development easy. Full phone software stack including applications Designed as a platform for software development.

II.PROPOSED METHOD

The proposed system provided an efficient interactive streaming service for diversified mobile devices and dynamic network environments.When a mobile device requests a multimedia streaming service, it transmits its hardware and network environment parameters to the profile agent in the cloud environment, which records the mobile device codes and determines the required parameters.Then transmits them to the Network and Device-Aware Multi-layer Management (NDAMM). The NDAMM determines the most suitable SVC code for the device according to the parameters, and then the SVC Transcoding Controller (STC) hands over the transcoding work via map-reduce to the cloud, in order to increase the transcoding rate.The multimedia video file is transmitted to the mobile device through the service.



Adaptive Communication and Multi-Layer Content Selection (ACMCS)

When the predicted bandwidth state and the Bayesian predictive network are determined, the cloud system will further determine the communication and the required multimedia video files according to the information.

Communication Decision:

A good dynamic communication mechanism can reduce the bandwidth needs and the power consumption of the device resulting from excessive packet transmission, and the transmission frequency can be determined according to the bandwidth and its fluctuation ratiobased on such dynamic decision-making. The transmit modeis engaged until the device finds a variation of the transmittedvariables that exceeds a threshold. Although the threshold canreduce the communication frequency effectively and precisely,in this mode the mobile device must start up additional threads for continuous monitoring; thus, the load on the device side isincreased.

The communication time is shown as:

$$Tc_{est} = Tc_{org} - \lambda|Bw^{(t)} - \frac{Bw_{avg}|}{Bits}$$

among which, represents the corresponding factor of the bandwidth difference to the stream flow, and is the set maximumcommunication time, considering the effect on networkquality, for the correction of .

$$\lambda^{(t)} = \lambda^{(t-1)}(1-\rho),$$
$$\begin{cases} \rho < 0, & \text{if } ||Bw^{(t)} - Bw_{avg}|| > 3Bw_{std} \\ \rho > 0, & \text{if } ||Bw^{(t)} - Bw_{avg}|| < 3Bw_{std} \end{cases}$$

When the network bandwidth difference exceeds a triple standarddeviation, this indicates the present network is unstable.The overall communication frequency shall incline to frequency to avoid errors; however, when the network bandwidth differenceis less than a triple standard deviation, the current networkis still in a stable state, and the influence on bandwidth difference can be corrected gradually.

SVC Multi-Layer Content Decision:

SVC is an improvement over traditional H.264/MPEG-4 AVC coding, as it has higher coding flexibility. It is characterized by temporal scalability, spatial scalability and SNR scalability, allowing video transmissions to be more adaptable to heterogeneous network bandwidth.

This study investigated how to determine an appropriate multimedia video streaming service according to these three major characteristics. First, the appropriate bandwidth interval was determined, in which the average bandwidth was used as the standard value and each standard deviation wasthe bandwidth interval segment. Let be the bandwidth aggregate, then:

$$\Phi = [Bw_{avg} - nBw_{std}, Bw_{avg} - (n-1)Bw_{std}, \ldots, Bw_{avg}, \ldots, Bw_{avg} + nBw_{std}]$$

A quadruple standard difference is assumed to be theboundary value. As the communication and prediction mechanism are constructed, the system will correct the overall threshold according to the bandwidth variation gradually, inorder to avoid the bandwidth boundary exceeding the practical situation. When the bandwidth interval is completed, it becomes the criterion of the video

streaming bit rate. The appropriate resolution and frame rate can then be determined as streaming data. Among these, the multimedia file shallconform to the following conditions:

$$V = \Sigma \arg\max\{Bits(R_i, F_J) < \Phi_K\}$$
$$P(\zeta, \eta | R = R_i, F = F_j, CP) > 80\%.$$

As mentioned above, the system will determine the ultimateresolution and a frame rate that are lower than each frequencyrange interval as the multimedia space and time features. The file must enable the device to decode smoothly and finish thecomplete decoding. The overall work flow is shown in the followingFig. 3. When the mobile device transmits the current network and hardwarefeatures to

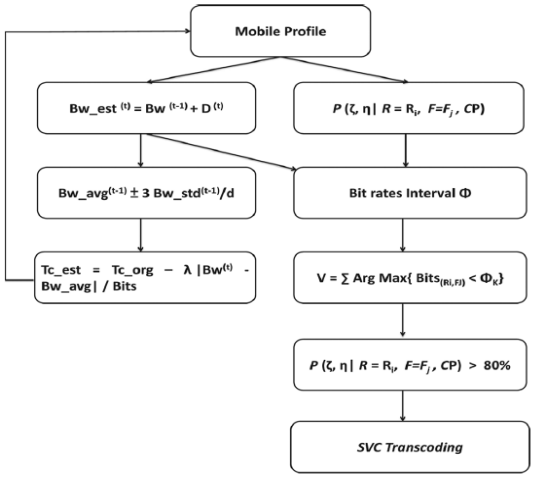


Fig. 3. Flowchart of SVC Content Decision.

the cloud environment, the NDAMM will predict the bandwidth at the next time point accordingto the bandwidth and standard deviation and will identify whether the bandwidth state is stable or not. The DBPMinfers whether the multimedia video, at different resolutions and frame rates, can complete smooth decoding and whether the hardware can provide complete video playback services, according to the profile examination and subsequent hardwarefeatures.

Advantages:

- The network bandwidth can be changed dynamically.
- This method could provide efficient self-adaptive multimedia streaming services.
- It could reduce cost, improve performance by using HTTTP Pipelining concept.
- It produces high quality video by avoiding video
- traffic and loss of data during buffer.

DISADVANTAGES

Over all process more time required.

APPLICATION

Used in transmission of video in multi connected devices

III.CONCLUSION

For mobile multimedia streaming services, how to provide appropriate multimedia files according to the network and hardware devices is an interesting subject. In this study, a set of adaptive networks and a device aware QoS approach for interactive mobile streaming was proposed. The DNEM and DBPM were used for the prediction of network and hardware features, and the communication frequency and SVC multimedia streaming files most suitable for the deviceenvironment were determined according to these two modules. In the experiment, the overall prototype architecture was realized and an experimental analysis was carried out. The experimental data proved that the method could maintain a certain level of multimedia service quality for dynamic network environments and ensure smooth and complete multimedia streaming services. Cloud services may accelerate research on SVC coding in the future.this study presenteda network and device-aware Quality of Service (QoS) approach that provides multimedia data suitable for a terminal unit environmentvia interactive mobile streaming services, further considering the overall network environment and adjusting transmission frequency and the dynamic multimedia transcoding , to avoid
And terminal power. Finally ,this study realized prototype of the architecture to validate the feasibility of the proposed method.

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