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Buffer-Free Video Streaming

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Abstract: *This paper is based on classification of video traffic that provides self-adaptive multimedia streaming with the Quality of Service as guaranteed. This paper shows how a mobile device can able to stream the videos that is incompatible in the particular devices with almost no buffering and also to provide efficient self-adaptive multimedia streaming services for varying hardware and network environments. The idea behind this concept is to change the video codes of the video based upon the configuration of the mobile devices like network bandwidth, version of the phone etc. Based upon the hardware and network environment parameters the video codes gets converted and streamed and also helps prevent bandwidth wastage.*

Index Terms *–video streaming server (VSS), Streaming Video Conversion (SVC)*

1. INTRODUCTION

Cloud multimedia services provide a capable, flexible, and scalable data processing method and offer an elucidation for the user demands of high quality and diversify multimedia. Accessing multimedia video services through networks is now not a 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. No matter what the service is, users will always expect powerful, sound and stable functions. For multimedia videos, stability is of the greatest importance. 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 retrieved easily using mobile phones, allowing users to enjoy anywhere 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 which provides multimedia data suitable for a unit environment via interactive mobile streaming services, further considering the entire network environment and adjusting the interactive transmission frequency and the dynamic multimedia trans coding, to avoid the waste of bandwidth and terminal power. Finally, the study realized a prototype of this architecture to validate the probability of the proposed method. According to the experiment, this method could provide self-adaptive multimedia streaming services for varying bandwidth environments efficiently.

2. LITERATURE SURVEY

First, we present a multimedia-aware cloud, which addresses how a cloud can perform distributed multimedia processing and storage and provide quality of service (QoS) provisioning for multimedia services. To achieve a high QoS for multimedia services, we propose a media-edge cloud (MEC) Architecture, in which storage, central processing unit (CPU), and graphics processing unit (GPU) clusters are presented at the edge to provide distributed parallel processing and QoS adaptation for various types of devices. To carry out a validation and a thorough experimental assessment of the performance of our cross-layer architecture as soon as its development will be completed. In addition, we would like to extend our study on this class of architectures to investigate the impact of dependability issues, such as fault tolerance and security, on their design. we have developed fully distributed scheduling schemes that jointly solve the channel-assignment, rate allocation, routing and fairness problems for video streaming over multi-channel multi-radio networks our work aims at achieving minimal video distortion and certain fairness by jointly considering media-aware distribution and network resource allocation. Cross-layer playback-rate based streaming services, which can maintain network transmission quality and receive data before playback reliably in IMS networks with many users.

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3. PROPOSED SYSTEM

3.1 SYSTEM ARCHITECTURE

The system architecture shows how the project works. Basically the work flow starts with a user that uses mobile phone to login the site that has 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 in the server, which records the mobile device codes and determines the parameters. Then the codes is transmits to Video Streaming Server (VSS).The VSS determines the most suitable SVC code for the device according to the parameters, and then the SVC Trans coding Controller (STC) hands over the trans coding work via map-reduce to the server, in order to increase the trans coding 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 3.1 shows the system architecture of the 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.

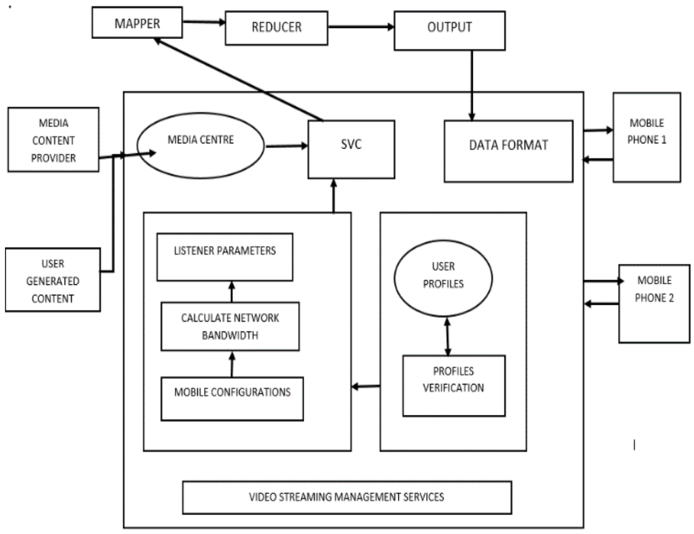

Fig3.1: - System Architecture

3.2MODULES

In this we have the following modules:

3.2.1User Profile Module:

The profile agent is used to receive the mobile hardware and network environment parameters and create a user profile. The mobile device transfers its hardware specifications in XML-schema format to the profile agent present in the cloud server. The XML-schema is a kind of metadata, which is mainly semantic and helps in describing the data format of the file. The metadata allows 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 phone device and sample relevant information. Through this function, the mobile phone devices can generate an XML-schema profile and transmit it to the profile agent for further examination. The profile agent finds out the required parameters for the XML-schema and creates a user profile, and then transfer the profile to the DAMM for identification.

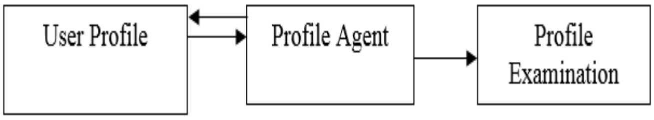

Fig3.2.1: - User Profile Module

3.2.1 Web service Connection:

When web 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 received can be examined and rendered in the application as needed. SOAP is a protocol specification for exchanging structured information in the implementation of Web Services in different computer networks.

3.2.2 Bandwidth Estimation

The NDAMM aims to determine the interactive communication frequency and the SVC multimedia coding parameters according to the parameters of the mobile phones. It gives these parameters to the STC for transcoding control, so as to minimize the communication bandwidths requirements and meet the mobile device user's demand for multimedia or video streaming. It consists of parameter profile module, a listen module, a network estimation module, a device-aware Bayesian prediction method, and adaptive multi-layer selection. The interactive multimedia streaming service should receive the user profile of the mobile device through the listen module. The parameter profile module records the user profile and determines the parameters. This is provided to both the device-aware Bayesian prediction module and the network estimation module and also predicts the required numerical values. Rh and Row represent the height and width of the supportable resolution for the device; CP and Crag represent the present and average CPU operating speed. Db and Db rate represent the existing energy of the mobile phones and energy consumption rate, and BW, BW stud, and Bag represent the existing, average and standard deviation values of the bandwidths. When this parameter form is maintained, then the parameters can be transferred to the network estimation module and the device-aware Bayesian prediction module for related predictions.

Fig 3.2.2.1: - Bandwidth Estimation

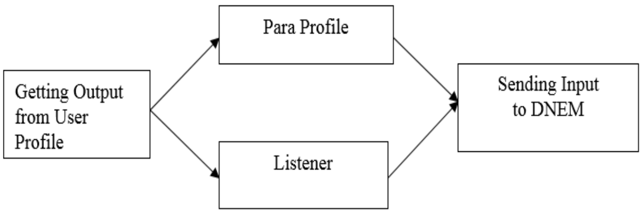

Fig 3.2.2.2: - Examining the User

3.2.3 Scalable Video Conversion

The DNEM is mainly established on the measurement-based prediction concepts; however, it further develops or generates the Exponentially Weighted Moving Average (EWMA). The EWMA uses the weights of the historical data and the current observed values to calculate gentle and flexible network bandwidth data for the dynamic adaptation of weights. In order to determine the precise network bandwidth value, the EWMA filter determines the network bandwidth value in which is the estimated bandwidth of the No. t time interval, is the bandwidth of the No. time interval, and is the estimation difference. For different mobile network estimations, this study considered the error correction of estimation and the overall standard difference and estimated the different bandwidths by adjusting the weights among which, is the moving average weight and is the standard deviation weight. When the prediction error is greater than, the system shall reduce the weight modification of the predicted difference; relatively, when the prediction 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 the standard difference, the predicted weight will increases as the corrected value of the 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 standard deviations of statistics, referring to identify the stable or unstable state of the current mobile network. If the present mobile network is in a stable state, it shall conform to the following equation among which, is the coefficient of the evaluated standard deviation. The value is almost 1.128. If the network bandwidth value of this time cycle is within plus-minus three standard deviations of the standard value, the present mobile network will be in a stable state; otherwise it will be in a fluctuating state.

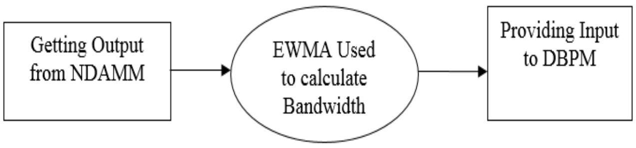

Fig3.2.3: - Calculation of Bandwidth for conversion

3.2.5 Streaming

The SVC hierarchical structure provides features like scalability of the temporal, spatial and quality dimensions. It adjusts along with the FPS, resolution and video variations of a streaming bit rate: however, the question remains in mind that how to choose an appropriate video format according to the available resources of various devices. Hereby, in order to conform to the real-time requirements of mobile multimedia, this study adopted Bayesian theory to retrieve or to infer whether the video features conformed to the decoding actions. The inference module was based on the following two conditions:-

• The LCD brightness does not always fluctuate. This hypothesis aims at 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 can be reduced effectively by adjusting the LCD, with multimedia services, users are very much sensitive to brightness; they dislike brightness of the video that repeatedly changes. As changing the LCD brightness will influence the energy consumption evaluation values, the LCD brightness of the mobile device is assumed to not able to change during multimedia service.
• The energy of the mobile device shall be sufficient enough for playing a full multimedia video. The full multimedia service must be able to last until the user is satisfied. This assumed condition is also the next main decision rule. As for the three video parameters of Frames Per Second, resolution and bit rate, 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.

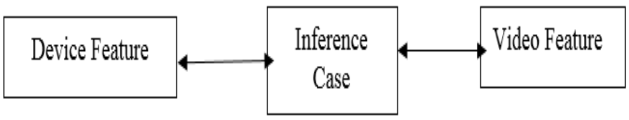

Fig3.2.5: - Streaming of Video

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3.3 EXPERIMENTAL RESULT

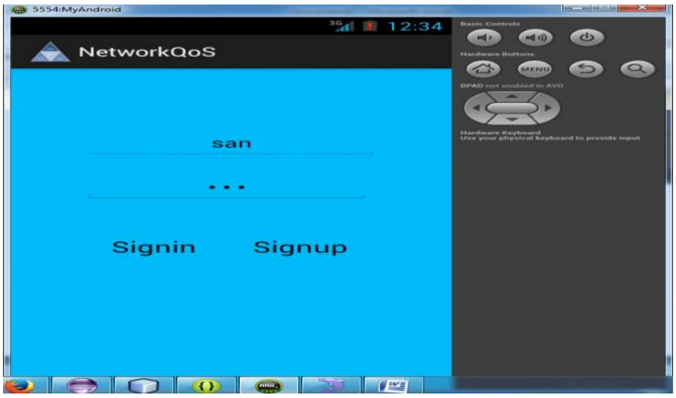

Fig 3.3.1:- Login Screen

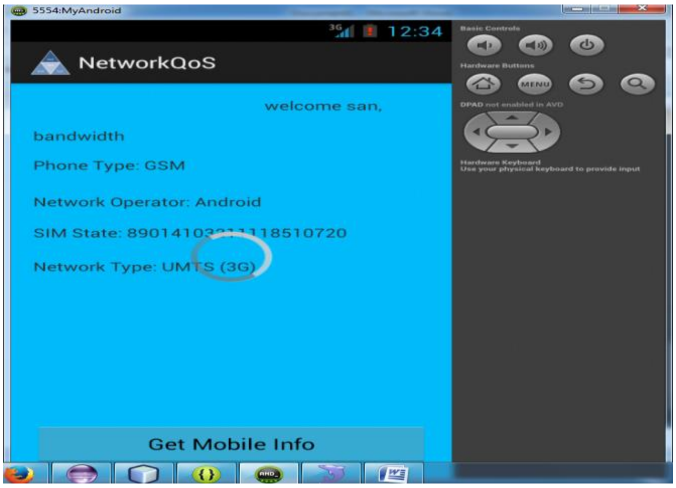

Fig 3.3.2:- Connection with Server

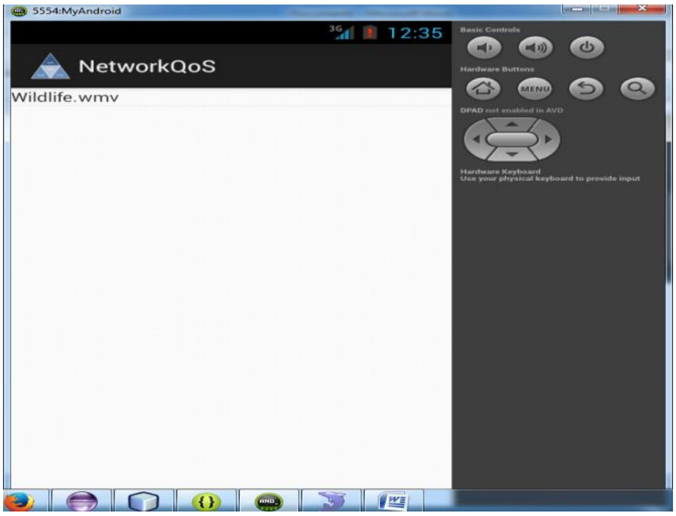

Fig 3.3.3:- Video selection

The workflow of the process is given below:

1) Fig:-3.3.1 is the login screen of the android application where the user is going to log in by entering username and password.
2) Fig:-3.3.2 shows the connection between the user mobile phone and the multimedia server. SOAP protocol is used for the connection between both mobile phone and server.
3) Fig:-3.3.3 shows the list of the videos present in the server.

4. 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 extensive 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. According to a modified K-SVD, Internet video traffic can be classified into corresponding QoS class with a SVM classifier. Experimental results demonstrate the feasibility of the proposed method. In future work, we will collect more video traffic data and further study the potential QoS pattern for more existing video applications.

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