Internet Video Traffic Classification Transfer Across Video Streaming

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Abstract - *The technological developments in wireless communication systems enable mobile users to control different radio interfaces (e.g., cellular and WiFi) for coexisting data transmission. However, the existing transmission process do not disquieting about the difficulty of real-time video transmission to the mobile users of co-located multi-homed mobile devices. To develop multimedia service provide capable, flexible, and scalable data processing method and offer a elucidation for the user demands of high quality and diversity 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. The performance estimation of the proposed algorithm, implement a test bed using the android mobile phone and the Scalable Video Coding (SVC) code. The results demonstrate the probability and effectiveness of the proposed adaptation algorithm for mobile video streaming applications in android application.*

Key Words*:* **Video conveyance; delay restraint; multihoming; video streaming.**

I. INTRODUCTION

Driven by the hi-tech encroachment in wireless announcement systems, recent years have witnessed the marvelous expansion of mobile video traffic over the net. The reputation of influential mobile terminals promotes the astonishing sketch of mobile video services. As discharged within the current report IT people scrutiny firm Gartner, international data processor shipments has reached 2.4 billion in 2016, of those eighty two are smart phones. Video streaming accounted for fifty fifth pace of the mobile traffic usage over and can reach seventy a decisive current trend linked this fabulous growth is that the quality of high definition (HD) video services. In spite of the speedy encroachment in mobile communication technologies, the network resources of existing 3G/4G systems are still constrained compared to the ever-growing video traffic.

Furthermore to traffic utilization, mobile video services have an unequivocal appropriateness and are receptive to setback and hindrance. Essential presentation metric for era of time traffic over wireless networks and allocated packets cannot donate to the cryptography technique. Good put differs from outturn because it indicates the number of knowledge with success acknowledged by the target at intervals a requested point. The video application insist on strict demand of instantaneity however copy toleration on video alteration. The vacillation and irresponsibleness of the communication methods in wireless networks, as one with the long delay, create crucial challenges to tackle the challenging Quality of expertise (QoE) requirements. As a result of conclusion for limited radio resources, the service quality of mobile networks is even worse in swarming places (e.g., subway stations), whereas in such places on-line video requests, for example live telecast videos are often generated. Therefore, it's essential to chew over reasonable consumption of the confidential radio property to satisfy the ever-growing demand for video services, moreover as providing higher QoE level.

Video streaming is gaining popularity among mobile users recently. Considering that the mobile devices have limited computational capacity and energy supply, and the wireless channels are highly dynamic, it is very challenging to provide high quality video streaming services for mobile users consistently. To overcome the above disadvantages of progressive download, dynamic adaptive streaming over HTTP (DASH) has been proposed. In a DASH system, multiple copies of pre-compressed videos with different resolution and quality are stored in segments. In this paper, formulate the multi-link video streaming process as a reinforcement learning task. For each streaming step, define a state to describe the current situation, including the index of the requested segment, the current available bandwidth and other system parameters. A finite state Markov Decision Process (MDP) can be modeled for this reinforcement learning task.

II. EXISTING SYSTEM

Several approaches have been projected for video broadcast to multihomed mobile devices.The most widely used algorithm are scheduling algorithm such as schedule the processing time for that appropriate video. In this section, we discuss the related works on the problems of the exsiting system. Furthermore, we can understand there are two distinctive ways for multi-path data transfer: Multiple Access Point solutions (MAP), under such position there are more than one access points (for instance, a base station or an eNodeB acts as one access point, a WiFi AP act as another access point) for each smartphone. A smartphone shall access the cellular network via the cellular boundary, and at the same time operate other interfaces (for example, WiFi interface) to connect the other access points respectively. The foreword of multiple access points increases the transmission bandwidth. A valuable advance is to permit a single smartphone using multiple interfaces (e.g. the cellular and the WiFi interface) to employ multi-path data transfer concurrently and thus diminish the pressure of mobile networks and in addition offer superior user experiences for video services. However, the smartphones are still contending transmission resources billed by these access points. Single Access Point solutions (SAP), in such circumstances there is only a single access point, which is usually the cellular base station. Each smartphone connects to this access point to battle restricted transmission resources using the cellular interface, while at the same time using another interface (Blue Tooth or WiFi) to form a local network and carry out data sharing within this network. Unlike the previous type, besides opposing resources owed by the access point, smartphones also cooperates with each other within the local sharing network using another interface concurrently. Uninterrupted virtual path production system over assorted wireless networks based on source code.The goal of this system is to exploit the video encoding bit rate on the basis of comprehensive bandwidth, as well as overcoming the channel loss. In journalism, the authors propose a sub-frame level (SFL) scheduling approach, which splits large-size video frames to optimize the delay performance of HD video streaming over heterogeneous wireless networks. Song and Zhuang present a Probabilistic Multipath Transmission (PMT) scheme, which sends video traffic bursts over multiple available paths based on a possibility generation function of packet delay. Wu et al. [30] introduce a dynamic rate allocation algorithm into joint source-channel coding (JSCC) to optimize the mobile video quality over diversed networks. Already propose a Distortion Aware Concurrent Multipath Transfer scheme (CMT-DA) to minimize the end-to-end video deformation in mobile video delivery over heterogeneous wireless networks.

MAP Video System:

The suggestion of using multiple interfaces of mobile devices has been explored before but not in the same way as in this work. Chebrolu et al. presented a network layer architecture that enables various multiaccess services. And an algorithm called Earliest Delivery Path First (EDPF) is proposed, which ensures packets meet their playback deadlines by forecasting packets based on the anticipated liberation time of the packets. The authors in urbanized a methodical framework which optimizes rate allocation based on pragmatic available bit rate (ABR) and round-trip time (RTT) over each access network and video distortion-rate (DR) characteristics. Alpcan et al. investigated a novel robust flow control framework for diverse network access by devices with multi-homing capabilities. In addition, the authors also proposed an H-infinity-optimal control formulation, which was used for allocating rates to devices on multiple access networks with heterogeneous time-varying characteristics. A framework is proposed in to mull over the problem of scalable video streaming from a server to multi-network clients over heterogeneous access networks while minimizing the misrepresentation of the established videos. The authors in whispered that the end- to-end video frame delay was a brutally demanding problem for high definition online video services, and planned SFL, which is a original scheduling approach, and intentionally splits large-size video frames into sub-frames and dispatches each of them onto a different wireless network to the multi-homed client. However, the devices outfitted with multi-interfaces in the solutions above toughen their streaming capacity on their own and overlook the potential supportive opportunity, which may lead to the resource opposition on the inadequated wireless networks.

Multiple Interfaces File System:

Quite a lot of works discussed the usage of multi-interfaces in categorized delivery systems. Enchanting the social ties and geographical propinquity into account, painstaking a scenario in which device-to-device and cellular connections are used to broadcast the content. The authors proposed an infrastructure that exploits wireless multiplicity (channel diversity, network diversity, and technology diversity) to offer enhanced data presentation for wireless data users. Boldrini el al. anticipated a context-aware framework, which is used for routing and forwarding in opportunistic networks. Tsao et al. demoralized cellular and WiFi interfaces simultaneously to create multiple paths to mobile devices. Soroush et al. investigated creating contemporaneous connections to multiple WiFi APs from highly mobile clients, and obtained a system called Spider. The author proposed BUBBLE, which is a social based forwarding algorithm to progress the forwarding efficiency appreciably compared to unconscious forwarding schemes. Nonetheless, the contemporary schemes always timetable the file data traffic in a content-agnostic approach without bearing in mind the complex video streaming personality such as the confident timeliness and understanding to delay and jitter requested by mobile video services.

III. PROPOSED SYSTEM

This architecture is made up of steps of procedure and each module holds a unique functionality. It starts with user profile, web service connectivity, bandwidth estimation, video compression and multi-homed transmission. Initially user profile is created, then screen resolution for that user's device is estimated, based on that screen resolution uploaded videos can be transmitted to multi-homed devices.

A. Architectural Diagram:

The architecture diagram for the proposed system is represented in the figure. This architecture is made up of steps of procedure and each module holds a unique functionality. It starts with user profile, web service connectivity, bandwidth estimation, video compression and multi-homed transmission. Initially user profile is created, then screen resolution for that user's device is estimated, based on that screen resolution uploaded videos can be transmitted to multi-homed devices.

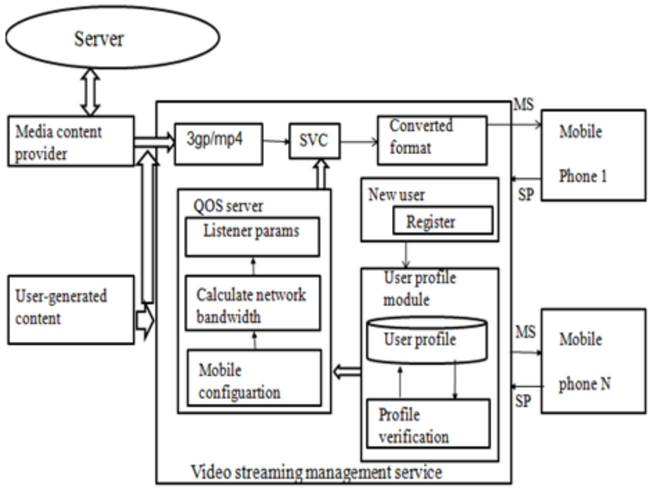
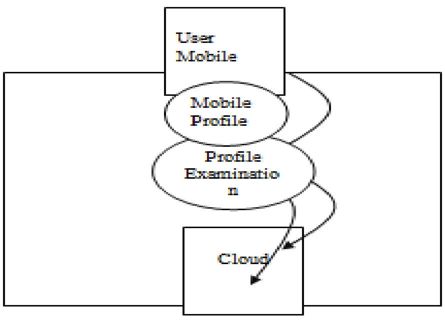


Fig1: Systematic Diagram

B. User Profile Creation & Web service connection:

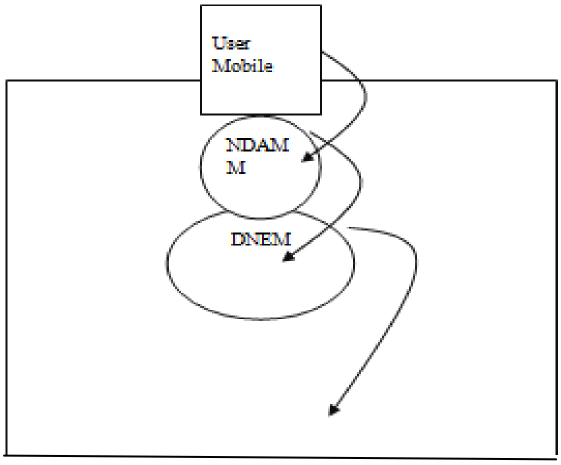
User Profile Creation:

The profile agent is used to receive the mobile hardware environment parameters and create a user profile. The mobile device transmits its hardware specifications in XML-schema format to the profile agent in the cloud server. The XML-schema is metadata, which is mainly semantic and assists in describing the data format of the file. The metadata enables non-owner users to see information about the files, and its structure is extensible. However, any mobile device that is using this cloud service for the first time will be unable to provide such a profile, so there shall be an additional profile examination to provide the test performance of the mobile device and sample relevant information. Through this function, the mobile device can generate an XML-schema profile and transmitted to the profile agent. The profile agent determines the required parameters for the XML-schema and creates a user profile, and then transmits the profile to the DAMM for identification.



Web service Connectivity:

When web methods are invoked from inside Android application, the application gets back the data from the server in the form of XML. The response which has been received can be parsed and rendered in the application as needed. SOAP is a protocol specification for exchanging structured information in the implementation of Web Services in computer networks.



C. Scalable Video Conversion:

The NDAMM aims to determine the interactive communication frequency and the SVC multimedia file coding parameters according to the parameters of the mobile device. It hands these over to the STC for trans coding control, so as to reduce the communication bandwidth requirements and meet the mobile device user's demand for multimedia streaming. It consists of a listen module, a parameter profile module, a network estimation module, a device-aware Bayesian prediction module and adaptive multi-layer selection. The interactive multimedia streaming service must receive the user profile of the mobile device instantly through the listen module. The parameter profile module records the user profile and determines the parameter. This is provided to both the network estimation module and the device-aware Bayesian prediction module to predict the required numerical values. Rw and Rh represent the width and height of the supportable resolution for the device, CP avg and CP represent the present and average CPU operating speed. Db and Db rate represent the existing energy of the mobile device and energy consumption rate, and BW, BW avg, and BW std represent the existing, average and standard deviation values of the bandwidth. When this parameter form is maintained, the parameters can be transmitted to the network estimation module and the device-aware Bayesian prediction module for relevant prediction. The DNEM is mainly based on the measurement-based prediction concept; however, it further develops the Exponentially Weighted Moving Average (EWMA). The EWMA uses the weights of the historical data and the current observed value to calculate gentle and flexible network bandwidth data for the dynamic adjustment of weights. In order to determine the precise network bandwidth value, the EWMA filter estimates the network bandwidth value in which is the estimated bandwidth of the 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 error is less than, the system shall strengthen the weight modification of the predicted difference. When the changed bandwidth of the system is greater than the standard difference, the predicted weight will increase 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.

The equation for prediction for a new input using the dot product between the input (x) and each support vector (xi) is calculated as follows:

$$f(x) = B(0) + sum(ai * (x,xi))$$

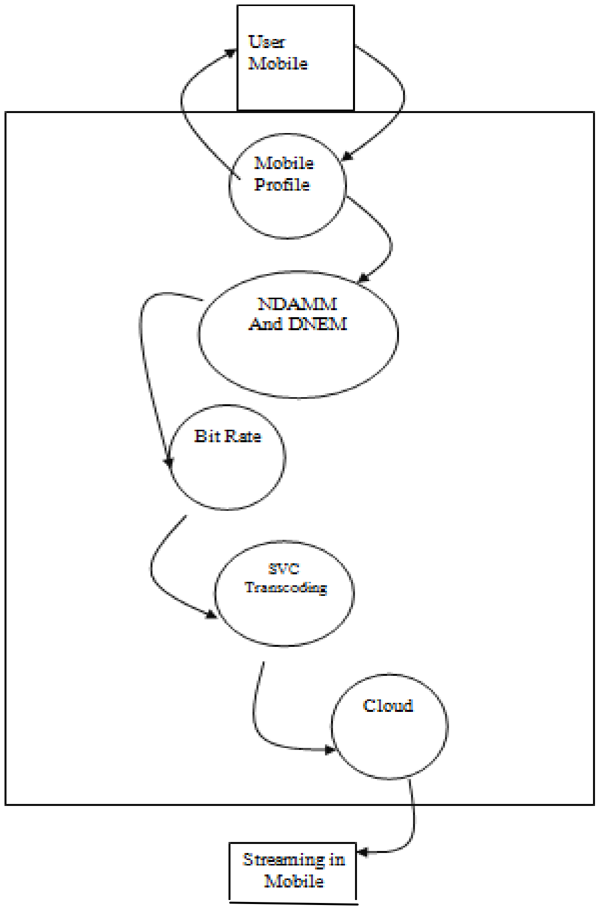
This is an equation that involves calculating the inner products of a new input vector (x) with all support vectors in training data. The coefficients B0 and ai (for each input) must be estimated from the training data by the learning algorithm.

The polynomial kernel can be written as

$$K(x,xi) = 1 + sum(x * xi)^d$$

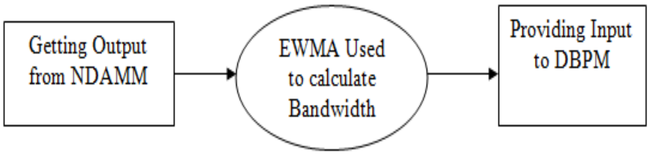
and exponential as

$$K(x,xi) = exp(-gamma * sum((x - xi^2))$$



Mobile Video Streaming:

The SVC hierarchical structure provides 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 of 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 infer whether the video features conformed to the decoding action. The inference module was based on the following two conditions: The LCD brightness does not always change This hypothesis aims at a hardware energy evaluation. The literature states that TFT LCD energy consumption accounts for about 20%–45% of the total power consumption for different terminal hardware environments. Although the overall power can be reduced effectively by adjusting the LCD, with multimedia services, users are sensitive to brightness; they dislike video brightness that repeatedly changes. As changing the LCD brightness will influence the energy consumption evaluation value, the LCD brightness of the mobile device is assumed to not able to change at will during multimedia service. The energy of the mobile device shall be sufficient for playing a full multimedia video 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 FPS, resolution and bit rate, the bit rate depends on the frame rate and resolution, so the Bayesian network adopts the frame rate and resolution as the video input features and uses the bit rate as parameter considered.



IV. CONCLUSION

To conclude, the proposed system reduces the vulnerability of the mobile data theft from the user side. A set of adaptive networks and a device aware QoS approach for interactive mobile streaming was proposed. The experimental data proved that the method could maintain a certain level of multimedia service quality for dynamic network environment and ensure smooth and complete multimedia streaming services. Cloud services may accelerate research on SVC coding in the feature. The overall network environment and adjusting the interactive transmission frequency and dynamic multimedia Trans coding, to avoid the waste of bandwidth and terminal power.

V. FUTURE ENHANCEMENT

In the Future work, First how to better allocate the loads between several links with finer granularity should be investigated. Second, to better predict the future bandwidth, the most recent estimation of bandwidth should be assigned with a higher weight. Last but not least, the size of the video segment should be further considered for variable bit rate (VBR) videos to improve the bandwidth estimation accuracy.

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