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REVIEW ARTICLE

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Analysis of android video streaming over Wi-Fi/Ad-hoc Network

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Abstract: With the rapid adoption of smart phones, mobile users have unique opportunities for mobile multimedia services. In this paper we present android video streaming over Wi-Fi/Ad-hoc network. With the help of smart phone (which are equipped with hardware that support real-time video processing are and ad-hoc wireless communication) real time video streaming over wireless multi hop transfer.
General Terms: This paper provide the evaluation of different android phones for different scenario

Keywords: Smart phones, android phones, wireless multi-hops, video streaming.

I. INTRODUCTION

The rapid adoption of smart phones has created a unique opportunity for mobile users. Most of Smart phones support real time video processing and ad-hoc communication.

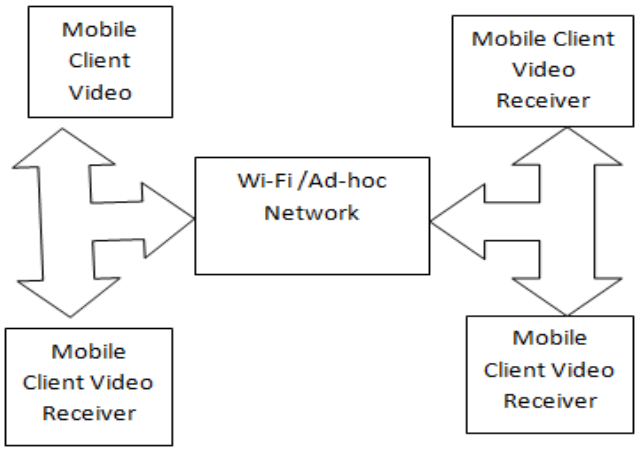

Figure 1: Design architecture

Currently system use TCP/IP protocol for communication and frames are transfer By the use of video processing server.

In this paper we present a Android video streaming over Wi-Fi/Ad-hoc network. We use multi hop video streaming. Multi hop network is based on existing access point and station, which are interconnected via Wireless link.

This application is used to capture live video using Android phones and share this video using free of charge wireless mesh network. We use Android phones for this application. Android phones are open source operating system for mobile platforms. This application is used in social networking cooperative field work and health impaired person etc.

In this paper, we evaluate the performance of video streaming in wireless multi hop of network using different Android phones.

II. OVERVIEW: THE BUILDING BLOCK

In this section we overview the basic building block that are used for peer to peer video streaming.

A. Introduction to Android system:-

Android is Linux based operating system which is designed for touch screen mobile devices. Android is a open source platform, initially developed Android INC. User applications are written in java and run on Dalvik which is Android & own java virtual machine.

Android consist of a Linux kernel which include device drivers and Android run time environment. Linux kernel provides the interaction between the Linux kernel and high level application framework. Android architecture is used for main hardware platform.

The Android SDK provides the API libraries and developer tools which are used to build, test are debug apps for Android. In our application video encoding and decoding are implemented using native development tool kit.

B. Encoding/Decoding standard:

Video encoding and decoding is most important for video streaming application .Android support H.263,H.264 AVC and MPEG-4 SP video.H.264 convert digital video into a format .This format take less capacity when it is stored or transmitted.

III. DESIGN AND IMPLEMENTATION

In this section we describe the design and implementation of wireless multi hop video streaming on the android phones

A. Routing and multi hop forwarding:

Sender transmit video stream by using the multi hop path. A routing protocol is used for establish and manage connectivity across multiple hops.

Our peer to peer video streaming application used OLSR protocol which is proactive routing protocol for mobile ad-hoc networks OLSR is an optimized protocol which is optimizing the flooding of control traffic .OLSR is designed to work in a distributed manner and does not depend on any central entity.

In this paper we study the feasibility for multi-hop video streaming using various generations of android phones.

B. Discoveries of video content providers:

In the ad-hoc networks discovery of video content providers is the most important task.

In this application video content providers use periodic broadcast advertisements over the multi-hop network to advertise receivers, whenever receivers are ready to stream a video. In this way on the network video content consumers will receive information.

C. Video encoding and decoding:

Video frames are encoded using the codes H.264 before sending on to network by using the encoding technique. Individual video frame size is reducing so that it required minimized bandwidth for streaming application.

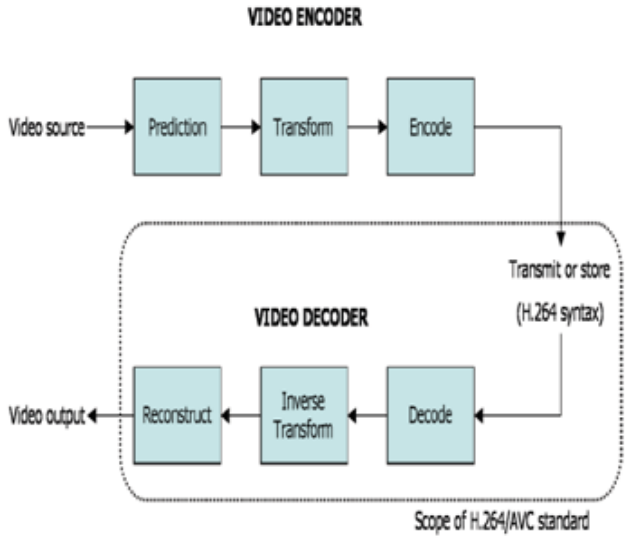

Figure 2: H.264 encoding and Decoding Process

H.264 video Encoder produce compressed H.264 bit stream prediction, transform and encoding process.

In the current version of application we use video codes H.264 (high quality video in relatively low bit rate) Audio codec: PCMU8 and Encoder: Lavf52.87.7

IV. EVALUATION OF VIDEO STREAMING APPLICATION

In this section we provide an evaluation of the video streaming application.

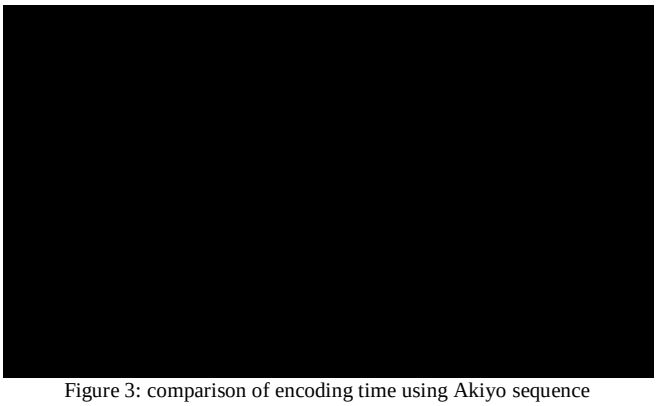

Figure 3: comparison of encoding time using Akiyo sequence

A. Experiment Device:

To demonstrate the feasibility of the video streaming application on Android phones we put three generation of android phones. Which are HTC Dream, Nexus one and Samsung galaxy s2.

Table 1. Device specifications

Device name	processor	connectivity	memory	OS version
HTC Dream	528 MHz	802.11b/g	192 MB	1.5
Nexus one	1.5 GHz	802.11b/g/n	512 MB	2.1
Samsung Galaxy S2	1.2GHz dual-core	802.11a/b/g/n	1 GB	3.0

By analysis of table we see that newer phones have almost double resource capacity, so newer generation mobile have better performance in video data processing.

B. Analyses of video encoding and decoding:

Performance of video streaming application is depends on the speed of en/decoding. In this paper we evaluate the performance of different codec and coding method.

We evaluate performance by average en/decoding time of single video frame and average size of compressed frame under different video quality. For experiment we use standard test sequences Akiyo and Coastguard. Akiyo and coastguard have 300 video frames and QCIF resolution.

We evaluate the encoding time of different codec and encoding method on the Samsung galaxy s2 and also evaluate the compressed size of the video frames.

Fig3. shows the comparison of encoding time using akiyo test sequence. By testing the sequence we observed that HTC dream which is first generation of android phones have worse performance than Samsung galaxy s2. H.264 takes 100 ms with intraframe encoding. 100ms encoding time should be able to produce video stream at around 10 fps .Samsung galaxy take 5ms which is much better than earlier generation of android phones.

C. Analysis of multi-hops forwarding:

To stream live video the multi-hops forwarding capacity is also important task to ensure that sufficient bandwidth is available for the application. To study multi-hop we take Samsung galaxy s2 as the sender and receiver. Add nexus one, HTC Dream in the middle to form multi-hop topology

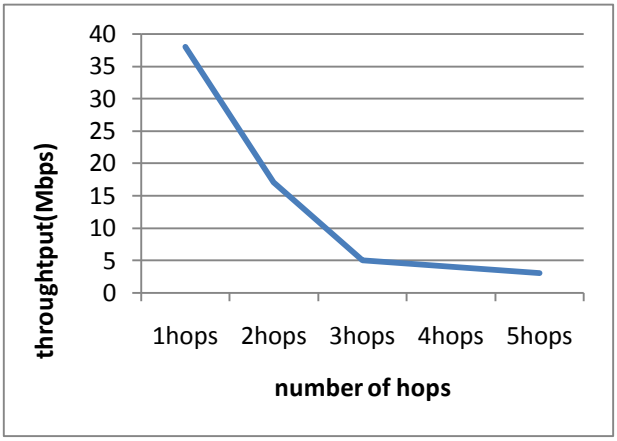

Figure 4: Throughput achieved over multiple hops

Fig4. shows throughput which is achieved over different hops. By analyzing the fig. we see that throughput drops almost half for every increase in the hop count.

V. CONCLUSION AND FUTURE WORK

In this paper we study the wireless multi hop video steaming application for android phones. This application provides user a facility to capture live video using the phone camera and to share these with his friend.
We also analysis the video streaming application in a number of experimental scenario, and we concluded that new generation of android phones provide better performance. We evaluated that wireless hops of our application handle video streams with high quality.
For future work we extended the evaluation to study the application performance for large network.

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