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The video streaming over Wi-Fi network application client on the Android platform

Preeti Yadvendra
M.Tech. Student (C.SC.)
GEC, Ajmer (Rajasthan),India
Preeti26nov@gmail.com

***Abstract*- Smart phone provides many multimedia services for mobile users. Most of these smart phones are equipped with hardware (that support real time video processing). These phones also have a Ad-hoc wireless communication between peers. Using smart phones real time video can be streamed over multiple wireless hops between peer devices. Real-time video processing) and ad-hoc wireless Phones within communication range of each other automatically establish a wireless link creating a client mesh network (ad-hoc network of devices). In the client mesh network each phone can produce or consume video. These phones also perform as a relay to forward video to next hop in the client mesh network. By using Peer-to-peer video streaming from the smart phones camera allow user to share live video. Such streaming can be used in a variety of applications.**

Keywords- Android phones, ad-hoc network, multi hoping, video streaming

I. INTRODUCTION

Mobile multimedia content is becoming the dominant form of information [7]. Majority of Smartphone equipped with hardware that support real time video processing and ad-hoc wireless communication. This Smartphone provide a real time video streaming over multiple hops between peer devices. Majority of Smartphone allows a real time video streaming over multiple wireless hops between peer devices. Phones create a client mesh network (ad-hoc net work of devices) by establishing a wireless link between the phones which are in a communication range. In this client mesh network each phones is able to produce and consume video and also relay to forward video to its next hop neighbor users can share what they see by using peer-to-peer video streaming and cameras on their smart phones. In such a way they can use streaming in various social network applications, cooperative field works etc.

By using android operation system this application, present a wireless multi hop video streaming application. This application allows sharing live information which is captured by camera.

Microphone user can share information with persons that might be multiple wireless hops away. Mobile phones streamed video by peer-to-peer communication i.e. without the use of video processing server or network infrastructure. The main aim to create a multi-hop video for the effective wireless multi hops video streaming over the Wi-Fi within the organization. Currently no system is available for wireless multi-hop video streaming. Existing system for video streaming is use TCP/IP protocol. These system use TCP/IP protocol for transfer the frames from one system to another and use stored forward procedure. These systems transmit and retransmit the copy of the frames from the source or server.The objective of this paper is to implement real-time video streaming over multiple wireless hops between peer devices based on multi-hop routing. It provides a mobile application, the video streaming over WI-FI /Ad-hoc network application. Client on the android platform, focus here on the feasibility of using various generations of android phones for multi hop infrastructure less video streaming. For this, discovered a way to allow creation (and termination) of ad-hoc network with the android OS.

The second goal is to implement android application to run on these devices. Utilizing the main possibilities of create multi-hop network and streaming video from one phone to another by using ad-hoc network.

II. LITERATURE SURVEY

The International Telecommunication Union's (ITU) statistics on mobile subscriptions indicates five billion mobile subscriptions for 2010 [1], with a 17% penetration of smart phones in 2009 [2]. For mobile users smart phones have created a unique opportunity for mobile multimedia services. Now a day's most of smart phones are equipped with both hardware (that supports real-time video processing) and ad-hoc wireless communication between peers and this allows real-time video streaming over multiple wireless hops between peer devices. Phones within communication range or area of each other automatically establish a wireless link creating a client mesh network (ad-hoc network of devices). Such streaming can be used in a

variety of applications such as social network

Joint fieldwork (providing video distribution for teams distributed in a small region, e.g. teams of repairmen, and search and rescue teams in adversity areas), and support for health impaired team including the elderly.

With Smartphone adoption on the rise, opportunity for marketers is calling [2], the mobile industry is on a fast-track, with immense expansion in mobile promotion, advertising and paid-content for users. But what is really most important, that development is the increase in quality devices and fast, reasonable data. While Smartphone tenure was once just a business tool, more consumers than ever are using smart phones in their daily lives. In the history alone, the total figure of Smartphone subscribers increased 72% quarter-over-quarter, rising from fifteen million subscribers in Q2 2008 to twenty six million in Q2 2009. While the incursion level of Smartphone users is still fairly low – nearly 17% in Q2 2009 they make up half of the mobile Web audience. With the continued extension of Smartphone rights in the U.S. and the accessibility of more affordable devices, the market is opening up to a larger range of clients. However, continue to see same demographic profiles for Smartphone owners as we did a year ago. While Smartphone usage is moving from purely business use to both personal and business use, owners are still more than two times as likely to own a Smartphone for business usage only. Smartphone owners continue to be mostly male, are 65% more likely than the average mobile subscriber to be between the ages of 25 and 34, and nearly twice as likely to create more than $100,000 a year.

Existing System

There exist solutions that provide video services for mobile devices. In [3] H.L. Cycon present a peer-to-peer videoconferencing application with modified H.264 video codec for mobile phones. Though, the use of a modified codec and development library poses an issue on portability to other mobile devices for wider operation..Qik [4] use client server architecture to streaming real-time video. That is mobile phones (with Qik as the client) stream live video to centralized processing servers using the available network infrastructure (such as cellular or Wi-Fi networks).Qik provide Video sharing services over the Internet, so it depends on the network infrastructure. Peer-to-peer live video streaming is currently not supported by Qik.

III. PROPOSED SYSTEM

In this paper, present a wireless multi-hop video streaming application for the Android based mobile devices (including Android based tablet PCs). With application

help of this application, users can stream live video using their android phones camera, and share this video with people nearby using a wireless mesh network without any charge. Routing protocols can be installed to make easy the multi-hop communication to go beyond a single hop.

A: Related Work

Android development sdk. [5]. The API libraries and developer tools which are necessary to build, test, and debug apps for Android is provided by android software development kit. For a new Android developer, recommends to download the ADT Bundle to quickly start developing apps. It includes the essential Android SDK mechanism and a version of the Eclipse IDE with built-in ADT (Android Developer Tools) to streamline an Android app development. The ADT Bundle includes everything our need to begin developing apps:

Eclipse+ADT plug-in

Android SDK tools

Android platform-tools

The latest Android platform

Optimized link state routing protocol (olsr).[6] for a large dense mobile network olsr is well suited proactive protocol .It provide a more optimization in compared to classic link state algorithm. OLSR uses hop-by-hop routing. Each node uses it local information to route packets.Network where between a larger set of nodes traffic is random and where the communication pairs change over a time, OlSR protocol is well suited. In this situation no addition control traffic is generated since routes are maintained for all known destination at all times.

B: System architecture: The Mobile Application is broken down into two major subsystems: First, the mobile client presents a wireless multi-hop video streaming application for mobile phones with the Android operating system [11]. Mobile phone sensors (camera, microphone) capture a video and with the help of this application, user can share live information with people that might be multiple wireless hops away. Second, the video streaming is based on peer-to-peer communication between mobile phones (without the use of video processing servers or network infrastructure.

Decomposition Description

The mobile application subsystem is divided up into a three layered architecture; it has a user interface, application, and device layer.

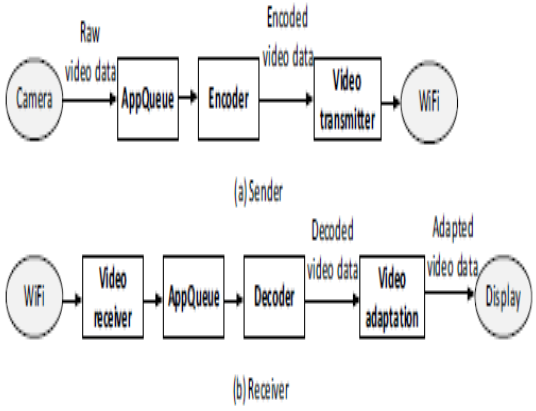

Fig 2: Layout of Encoding and decoding

The user interface layer have an observer object, this layer updates its data by using data from the observable application layer, via the observer pattern. Interface layer will handle Video encoder/decoder part. Massages which are arrives from the user interference layer are send to the device layer with help of application layer. Message and Threads from the user interface layer are handled by the application layer. The interactions with the hardware are handles by the device layer. all the features of the phone necessary for the application, including but sending video streaming over WI-FI, and ports to send and receive data to and from the other Android phone. All three layers have its own interface that other layers can use to interact with it.

C: System requirement

- Hardware Requirement

1. Wi-Fi Router
2. Android 2.3/4.0 based mobile

- Software Requirement

1. Jdk1.6
2. Android sdk4.0

D: Video Streaming using H.264 encoding and decoding

H.264 is industrial video compression standard [9]. It is currently most commonly used format for recording, compression, and distribution of high definition video [10]. After the compression of digital video H.264 convert this video into a format that takes up less capacity.

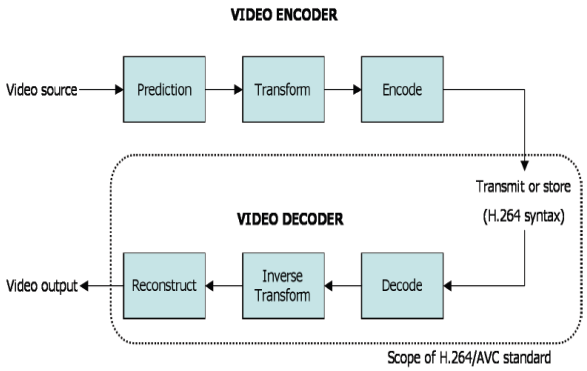

Fig 3: Video Streaming using H.264 encoding and decoding

When these compressed data is stored or transmitted, it consume less space and communication time. This Compression technique is most commonly use in digital TV, DVD-Video, mobile TV, video conferencing and internet video streaming uses.

Applications:

H.264 improves compression performance and transmission support. An H.264 encoder can select from a broad variety of compression tools, making it appropriate for proper applications ranging from low-bit rate, low-delay mobile transmission through high definition consumer TV to professional TV production.

H.264/AVC is being adopted for an increasing range of applications, including:

- High Definition DVDs (HD-DVD and Blu-Ray formats)
- HD Television broadcasting in Europe
- Apple products including iTunes video downloads, iPod video and MacOS
- NATO and US DoD video applications
- Mobile TV broadcasting
- Internet video

E:Real Time Streaming Protocol (RTSP):

The RTSP establish and control media sessions between end points. Clients of media servers issue VCR-like commands, such as play and pause, to facilitate real-time control [13]

Media Delivery
The delivery of media to the RTSP client is done with a protocol outside of RTSP and this protocol is determined during the session establishment. This document demonstrates that how media is delivered with RTP over User datagram protocol, Transmission control protocol or the RTSP control connection.

Session Maintenance and Termination
Established session context is kept alive by having the client show liveness. This can be done by two ways:

- edia transport protocol keep-alive. RTCP may be used when using RTP.
- ny RTSP request referencing the session context.l of playback of media files from the server.

F: Flow Diagram

Video sender flow diagram:

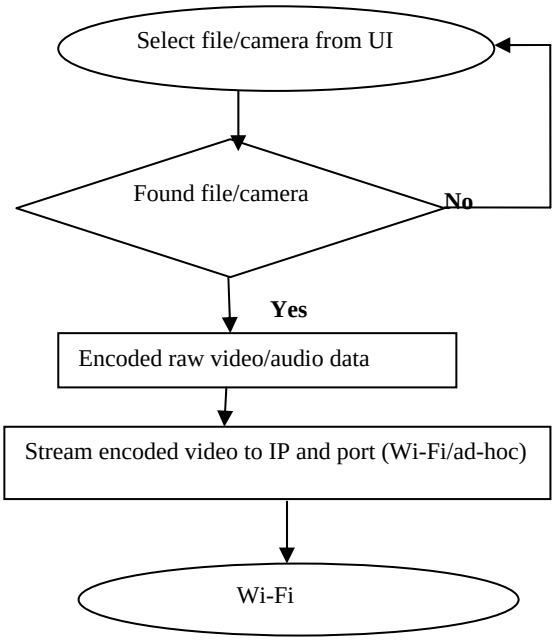

Fig 4: Video sender flow diagram

When starting the streaming application raw video data is retrieved from the camera/file and stored in the application queue (for buffering purpose). This raw data is then passed to the encoder, which encodes the data using the selected codec and encoding technique. The encoded video frame is then transmitted over-the-air by the Wi-Fi module. At the receiver, when an encoded video frame arrives, it is buffered and sent to the decoder. Before being displayed on the screen, the video frames may require adaptation to the hardware specifications (e.g., screen resolution).

Video Receiver flow diagram

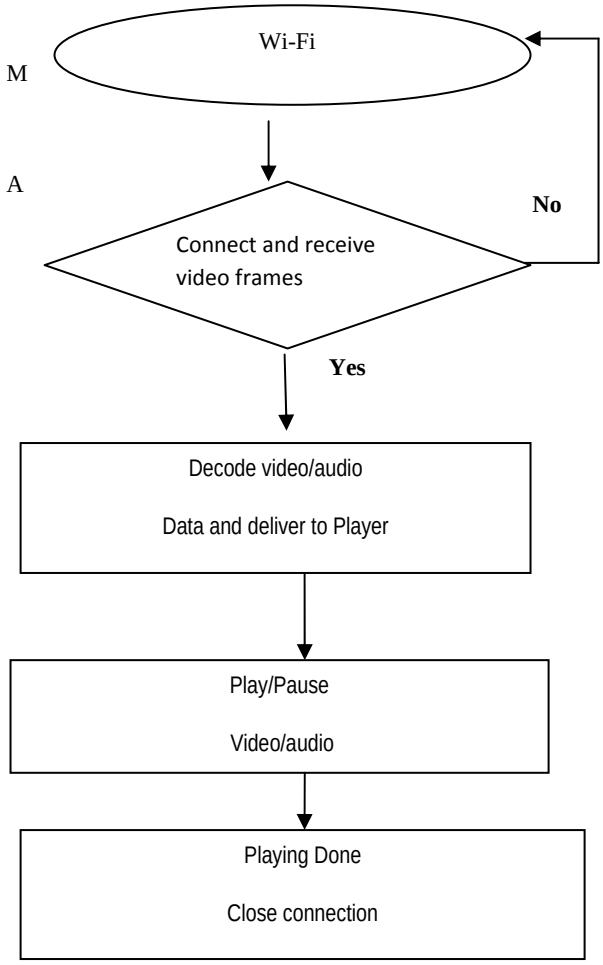

Fig 5: Video Receiver flow diagram

Receiver connects to streamer client and receives the encoded video and starts processing the decoding, it will keep receiving frames till the end of video or closing the connection from the client.

G: Advantage of proposed system

- O ver the wireless mesh network of phones a user can stream live video.
- U ser can entertain own or group of people in remote

location where internet connection are not available.

- his application can be used in defense project where camera view can be shared to backend team to be prepared when front team is on work.
- n a proposed system to transmit live data, use adaptive bit rate streaming. This system use HTTP protocol. If data is lost in one route, that can receive data from other route, so it overcomes data drawback of TCP.
- ***: Disadvantage of proposed system***
- urrent design is able to run correctly on unreliable connection, where packets may move away from the transition range of the medium.
- or efficient transmission of packets need more bandwidth, low end medium may not contribute much in multi-hop communication.
- hen multi-hop communication is adopted data security is a most important issue

IV. TESTING

During software development, testing plays a role to major quality control. Its basic function is to detect the errors in the software.
The below table will explains the test case of Cam Input table with all mandatory fields , descriptions , test case data and expected output against the correct one.

Table1. Test case of Cam Input

S. N.	DESCRIPTION	INPUT	EXPECTED OUTPUT
1	user will select setting in apps	audio stream ,frame rate	it should change the option based on user choice
2	1st mobile user will select the v stream option		camera should get on start video capturing and streaming the data
3	2nd mobile user pass the IP Address for seeing streaming on mobile	192.168 .1.5	Start displaying the moving frame on 2nd mobile
4	2nd mobile user route the		should display face is existing or not in cloudlet
	mobile		

FUNCTIONAL TEST CASE

Table 2. Test functionality of Server Connection

STEP NUMBER	DESCRIPTION	INPUT	EXPECTED OUTPUT
1	Configure router		It should be connected properly and configure IP address
2 H	Configure router		it should display error message if not connected
3 C	load the application in android phone		it should be installed properly else display error message
4 F W	Stream the apk in mobile	touch on apps	it should establish the connection else display error connection

Table 3 .Test functionality of apps for video streaming

1	Select the frame rate and set the size	frm=100	it should be accepted without any error message when send button is clicked
2	Select audio streaming		an error message showing "invalid Streaming " should be displayed when send button is clicked if no network found
3	enable audio streaming		an error message showing "invalid " should be displayed when send button is clicked
4	enable audio streaming		it should make enable for the further purpose

V. FUTURE GOALS

- For future work planning to extend the evaluation tested to study the application performance within a larger network.

- Developing a better user interface with extra features, such as implementing multicast over multiple hops and allowing users to record video contents on local SD cards while streaming or forwarding.
- Introducing a feature that can protect the shared contents between sources to destination transmission.

VI. CONCLUSION

In this paper, presents video streaming over Wi-Fi network application client on the Android platform. This application allows users to capture live video using the mobile phone camera and to share these with people who might be multiple wireless hops away. The video are shared using wireless client mesh network (ad hoc network) established between mobile phones. Therefore the video streaming does not rely on a conventional network infrastructure so it is a free-of-charge communication. Multi-hop video streaming can be used in a variety of application domains including social networking). Recently iphone5 has introduced video streaming with the cost of 45 to 65k which is not possible for every man. This idea develops similar apps without using infrastructure in android based mobile so that common man can use the feature in their daily life.

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