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Video Calling Over Wi-Fi Network using Android Phones

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Abstract
The intent of the paper is to develop a system that would perform video call over Wi-Fi network free of cost. Information of the caller or receiver is stored in database. For storing the information of caller and receiver we have a unique key called IMEI number i.e. International Mobile Equipment Identity. Before making a video call the user is supposed to have android mobile phone with video calling Wi-Fi application i.e. our app must be installed on it. After installing app on the user's mobile, user will register himself on our server. Registration task will be handled by connection manager and information of each user is stored in data-base. Once user gets registered, User will be shown the list of online users so that user will able to communicate with the other user by making a call or Receiving a call.
Keywords: IMEI, Android, Wi-Fi.

I. INTRODUCTION

A Wi-Fi phone uses wireless technology. There are designated areas in cafes and public areas known as hotspots where you can use a Wi-Fi phone. The Wi-Fi phone has all the same features as a regular phone. With normal cell phones, you can make calls, text message, receive voicemail and with limitations, access the Internet. The Wi-Fi phone has greater data retrieval capabilities and wider Internet access. There is no need for telephone lines to connect to the Internet.

Wi-Fi enabled mobile phones are popular in college going student as it provides the facility of chatting. The users of the mobile can view the list online users. This device is provided with the chat window so that users are able to chat among them. This system is designed to make video calling between the users on mobile phone.
The most immediate benefit of Wi-Fi enabled cell phone is faster Internet browsing. This device not only provides the facility of internet usage but also checks whether the same user is present in the database or not. The software includes authentication process also. First of all, if user wants to connect to the user, then he has to register himself by browsing registration page.

It has to give a unique display name which is not present in the database. If he chooses a unique display name, then he will be redirected to Display Client Activity. Then user will be able to see the details like IMEI number, local IP, SIM no and server IP. If he clicks "view online users" link on Display Client Activity page, then he will able to see the list of other users which are online at that time. That list is dynamic. If user clicks one of the users, then the dialog box is opened. The system provides 2 facilities to the user. He can do voice talk and text chat. If user selects text chat, he will be able to see chat window. Then, the user can send and receive message from other users.

System also provides one great feature of adding user on need basis without disturbing the current conversation. The user on another side receives chat invitation from this user. It will show by notification. Whether the user

wishes to communicate with the invitation is solely depend upon the user only.

II. WHY ANDROID?

Android Operating System has several advantages, as listed below:

- *Breaking down application boundaries :*
  Android breaks down the barriers to building new and innovative applications. With Android, a developer could build an application that enables users to view the location of their friends and be alerted when they are in the vicinity giving them a chance to connect.
- *Openness :*
  Android enables developers to create compelling mobile applications. It is built to be truly open, allowing developers' access core mobile device functionality through standard API (Application Programming Interface) calls. This is true, as a developer one can do everything, from sending short messages with just two lines of code.

- *Fast & easy application development :*
  Android will provide us an access to a wide range of useful libraries and tools that can be used to build rich applications. Android will enable us to obtain the location of the device, and allow devices to communicate with one another enabling rich peer-to peer social applications.

III. LITERATURE SURVEY

A. *Video calling using mobile phone*

Video calling is existing system which enables 2 mobile users to do video call. Basically but in this system mobile user require a registered SIM mobile, which charges them for calling.

B. *Video calling over internet*

The video calling over internet protocol using a simulated IMS environment. The number of different call case scenario that are most likely to be encountered when making the video call over internet using the internet protocol. This mainly focuses on SIP RTP/RTCP protocols. These protocols help during the course of call setup and media exchange between the various end callers involved.

C. Video calling over Wi-Fi with other technologies

Video calling over wireless networks has become increasingly popular as wireless networks become faster and more reliable and devices with cameras and video calling applications become more ubiquitous. Measurement and analysis of video calls over home, outdoor and cellular wireless networks have determined the criteria for making a successful call over a wireless network. Signal strength, packet loss, jitter and round trip delay are critical parameters. Video calling over wireless networks is shown to be practical, provided that the critical parameters are met. The big transition occurring today is the move from video calling on desktop and notebook computers to video calling on smart phones, tablets and televisions. This transition makes wireless home and public network performance and reliability more important than ever. Table1.1 shows some video call data.

IV. ARCHITECTURE

The Architecture consists of four basic modules as:

- *Registration:* Register with server through IMEI (International Mobile Equipment Identity) of phone and validates in database. If User is online the Status is set to "1" otherwise it is set to "0".
- *Server:* Server is used for authentication and maintaining the database of all users.
- *Chatting:* One user can chat with other online users by fetching the IP of other user through server.
- *Video Calls:* Users can make Video calls within the Wi-Fi network with online users for free. They can make Video call without 3G network or Sims Card.

As shown in fig.1.2. User A will have Video Calling application enabled android phone. User A will start the application and at the same time the Server will check the IMEI (International Mobile Equipment Identity) of User A in the database. If User A is not register then Server will launch the registration page on User A phone and will update the database with User a name, IMEI and status. If User is already register or newly updated then server will provide the list of other online user's. The Status of online user is set to "1" and offline user to "0" in database at server-side.

After acquiring the list of online user's from server the User A will select the user for video calling. After selecting user, the server will provide the IP of user to whom video calling is to be made to requesting user. The other user will get the request and if it agrees for video-calling then, there will be one-to-one video calling or

messaging between two users.

V. TRANSMISSION ALGORITHM

Each transmitted frame is marked with a timestamp, which represents the ideal play out time of the frame, according to the following rules:

- The timestamp of the first video frame represents the time at which the video frame is transmitted. If we denote this time with t, it follows that TS (1) =t.
- A frame I (I>1) is marked with TS(I)=TS(i-1)+α, where α=1/δ and δ is the number of frame that must be displayed every second.

VI. VIDEO PLAY OUT ALGORITHM

The receiver retrieves video frames from the network and plays out these video frames according to the following rules:

- Video play out immediately starts upon the reception of the first video frame. If this happens at time t', then TR(1)=t';
- The receiver plays out the frames at fixed period (i.e., one frame every $\alpha = 1/\delta$ time units);
- The arriving video frames are ordered according to their timestamps. The video frame at the head position (i.e., the one with the lowest timestamp) is candidate for being played out;
- The candidate frame, say frame I, is played out only if: a) TR(I) \get TS(I) and b) TS(I) > TS(prev(I)), where prev(I) is the frame played out most recently and TR(I) = TR(i-1) + kα (k ≥1). If conditions a) and b) are not met, then frame I is discarded and a new frame selection must be done (by applying rule 3);

If the video stream is transmitted with a best-effort service, it may happen that some video frames are delivered (and hence played out) later than expected (i.e., k≠1). If a video frame is played out later than expected, the video frame, as well as all the successive frames, is played out with a TR greater than expected (TR computed with k=1 is the expected play out time). This affects the VTD (which is computed as TR (I)-TS (I)) and poses serious problems if the supported application has interactive features and if the VTD (Video Time Difference) is above the NIT (Natural Interaction Threshold). For this reason, the VTD must be reported within the acceptable NIT. In it is shown that the VTD can be reduced of ϕ time units, by dropping a number of frames, say m, that corresponds to ϕ time units (i.e. mα=ϕ), where α=1/δ and δ is the number of frames played every second. Since the amount of time that exceeds the NIT is known (VTDNIT), the VTD can be reported within the NIT, by discarding a number of frames that corresponds to the time quantity VTD-NIT.

In essence, when the receiver finds out that the VTD is above the NIT (for instance when playing out frame I), it computes the value ϕ≡VTD (I)-NIT and computes the number of frames (m) that the server has to discard in order to report the VTD within the NIT. This number is sent to the server. Upon the reception of this number, the sender uses dropping frames algorithms to select the frames to discard and drops them. The dropping frames algorithms take into account the technique used to encode the video stream.

Although the discarding of video frames may increase the total packet loss, in it is shown that the perceived video play out quality is slightly affected.

VII. CONCLUSION

Thus Video Calling over Wi-Fi (VCOW) helps us to make a video call using IP enabled android phones. By VCOW it has been possible to implement the video call free of cost. This application thus can be very useful in any Wi-Fi enabled campus i.e., college, school, corporate offices etc.

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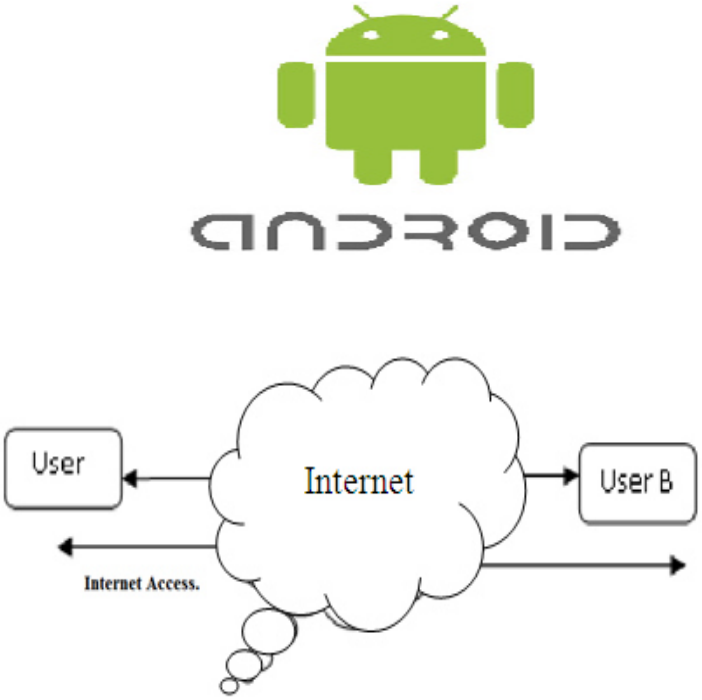

Fig 1.1 Video calling over internet

Table 1 Typical Data Rates Found For Video Call

Video call type	Tx Mbps	Rx Mbps	Video Quality
1080 Wi-Fi	5	5	*Excellent*
720 Wi-Fi	1.5	1.5	*Excellent*
3-Way Wi-Fi	1	1	*Good*
Smart Phone	0.5	0.5	*Fair*
3G Cellular	0.2	0.2	*Poor*

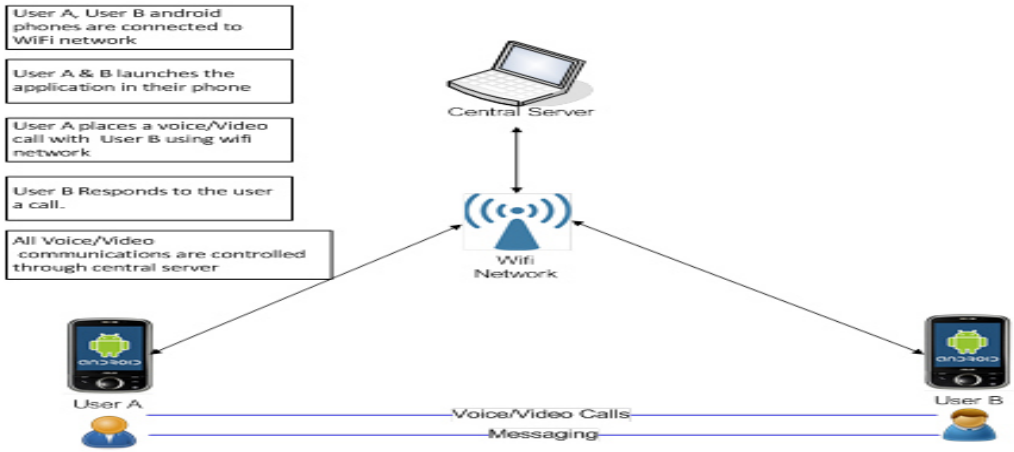

Fig 1.2 Video calling architecture

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