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Voice over IP mobile telephony using Wi-Fi

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ABSTRACT

Today, we are on the verge of wireless networking where everyone wants to be online without a bunch of cables. Colleges, B-Schools, corporate offices, and cafeterias provide Wi-Fi internet connectivity. The aim of this project is to make use of available resources to provide a free voice calls facility, without using a service provider. Pre-established Wireless Fidelity (i.e. Wi-Fi) service more often uses WLAN, which is offered as a voice transmission medium by Wi-Fi. Smartphones allowed by Wi-Fi can be connected to the router and can communicate with one another. This system will be the perfect alternative to the present intercom device.

Keywords— *VOIP, Wi-Fi, Voice Transmission, Internet Protocol, WLAN Systems*

1. INTRODUCTION

The ongoing advancement in the communication sector has paved the way for Voice over Internet Protocol (VoIP). VoIP is a collection of hardware and software that makes it easier for people to use the Internet as the communication medium for telephone calls by transmitting voice data in IP packets rather than using the Public Switched Telephone Network's traditional circuit transmissions. To make it easier for businesses and individuals to provide their own telecommunications services. The Internet Protocol (VoIP) has fundamentally changed the way telecommunications progresses. This technology is a form of telecommunication that allows the transmission of data and voice over a wide variety of networks. VoIP allows companies to talk to other branches over corporate intranets, using a PC phone. Driven by the ongoing deployment of broadband infrastructure and the increasing demand for telecommunications service, VoIP technologies and applications have led to the development of economical IP telephone equipment for an ever-increasing market for VoIP communication based on embedded systems. IP mobile phone application can provide the necessary interfaces between telephony signals and IP networks satisfactorily. The paper is organized as follows: Section 2 outlines the literature survey. Section 3 briefs about methodology followed by experimental results, conclusion, future work and references.

2. LITERATURE SURVEY

IP-based networking is a very challenging research-based subject with good potential for more opportunities with new developments in technology. Using peer-to - peer mechanisms is a novel way to use IP technology to make a secure connection between the two mobile devices. A design of an ideological algorithm is also presented to give a better idea of the process going on in the background, to establish a well-defined link. This method would be fully clear to the user and the user just needs to dial a number or send any of the data using the current hardware environment. To implement this program the Java for Micro- Computer or J2ME software will be used. [3]

Voice over Internet Protocol (VoIP), also known as IP telephony or Internet telephony, is a collection of protocols for transportation of voice traffic through IP-based packet-switched networks with suitable quality of service (QoS) and fair costs. Efforts over packet-switched networks to transmit voice can be traced back to the early 1970s. IP telephony technology has been progressing steadily since the mid-1990s, and it is expected as a viable alternative to conventional voice over public switched telephone networks (PSTN) due to its cost-effectiveness. Furthermore, by allowing the integrated transmission of voice and data over the same network, VoIP can efficiently provide compelling features and services such as voice mail, video conferencing, etc .. At the other hand, the Wireless Local Area Network (WLAN) is becoming popular for users near an access point (AP) in support of high-data - rate Internet access. WLAN's key advantages are its simplicity, versatility and cost-efficiency. The IEEE 802.11 WLAN has become an omnipresent networking technology over the past several years, and has been widely deployed around the world. While most current WLAN applications are data-centric, such as web browsing, file transfer and electronic mail, demand for multimedia services over WLANs is growing.

VoIP over WLAN (Voice over WLAN, VoWLAN) has recently emerged as an platform for cost-effectively providing wireless voice service. In the near future, VoWLAN will experience a dramatic rise, driven by demand from education, health care, retail, logistics etc. Supporting voice traffic over WLANs, however, poses considerable challenges since the performance characteristics of the physical and MAC layers are much worse than their wireline counterparts. Therefore, VoWLAN 's applications raise several deployment problems regarding system architecture, network capacity and admission control, QoS provisioning, etc. [4]

Recently, wireless technology has risen enormously in popularity, and it has become a network medium of choice. The revolution in wireless communication brings revolutionary improvements to data networking, telecommunications and is making interconnected networks a reality. In freeing the user from the cable, personal networking networks, wireless LANs, mobile radio networks, and cellular systems hold the promise of truly centralized mobile computing and communications, anytime, anywhere.

A similar pattern is seen in the field of voice communication, as it is now very popular to transmit voice over wireless communication channels, as is evident from the massive adoption of mobile telephony around the field. This can be seen from high performance levels of apps like Skype, VoIP is one example of a increasingly increasing speech technology. Voice over Internet Protocol (VoIP) technology supports packet-based IP networks for digitized voice transmission, it uses Internet Protocol for voice transmission as packets through IP networks, significantly increasing bandwidth, efficiency and facilitates creation of new services. VoIP has made it possible for service providers to deliver telephony services along with conventional data services using the same IP network and this in turn leads to better business models.
However, one fundamental problem that emerges is: "Can we obtain high quality VoIP over wireless networks while retaining its traditional position for data services at the same time?

In this report, we tackled this problem by performing VoIP calculation research for both Wi-Fi and WiMAX networks. The method adopted is based on simulation, using the well-known simulation tool ns2 [3] for networking research. We carried out two experiments: one for the IEEE 802.11 case and the other for the IEEE 802.16 case.

VoIP packets are sent in conjunction with TCP packets, and network performance is analyzed through different features such as jitter, packet loss, throughput, and delay. [5]

3. METHODOLOGY

When the user initiates the call by enabling the available Wi-Fi the calling signal is reaches to Wi-Fi so in the Wi-Fi send this signal to corporate Firewall in which it is used for Internet security and it send the signal through internet to UMA network. This network is a technology that enables you to make voice calls on a smart phone over a Wi-Fi network. This network transmits the signal to Rogers wireless network from this network the call is transmitted to GSM network to which the receiver is reachable. so finally, the receiver is connected with the sender for the call conversation.

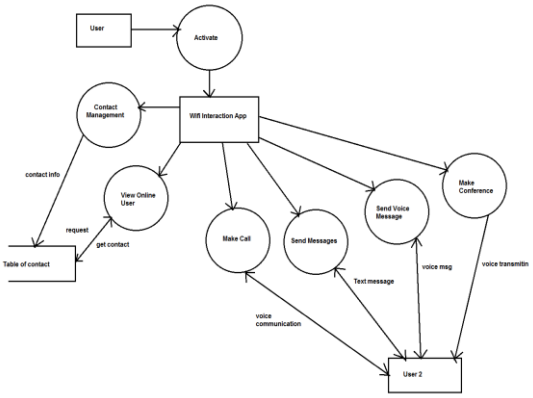

Fig. 1: Module interaction diagram

Figure 1 shows the module interaction diagram of the proposed system. When the user activates the application, it will check for the Wi-Fi connection. If the Wi-Fi connection is available then it will trigger the contact management function to get the contact information from the main contact and send request to each of the user to confirm the online presence .If the user present in the same Wi-Fi then their status become 'ON' and then the available contacts will be displayed to user by specifying green mark. By using this contact, the user can make call, send messages, send voice messages, and also make conference calls.

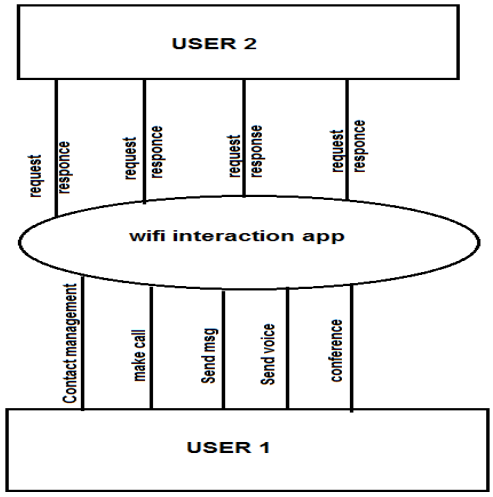

Fig. 2: Content flow diagram

The above Figure 2 shows the content flow diagram, where the user 1 will interact with the application for contact management at first, after that he can call or send message to user2. The Other user will interact with the Wi-Fi interaction app only to get request and send response.

The below figure 3 shows the use case diagram of the proposed system. Here the application user is the only user who performs all the functions of the application in their mobile. That is 'contact management' this function can automatically perform by the system/mobile and checks the status of all the other users for online presence.

Using these contacts, the user can perform all activities like making call, send message, and make conference calls or sharing files

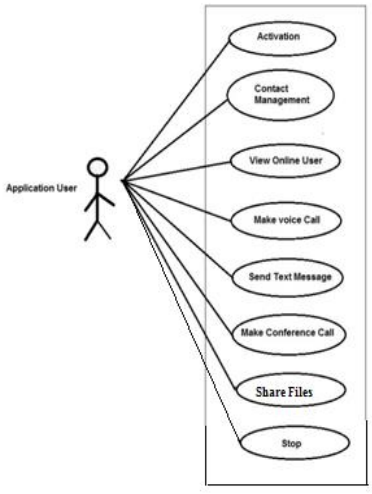

Fig. 3: Use case diagram

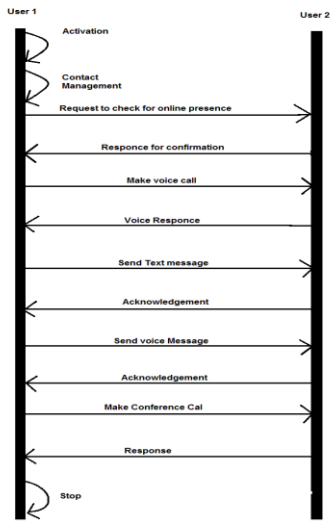

Fig. 4: Sequence diagram

The figure 5 shows the sequence diagram of this project, here it shows the how the application users will communicate each other in the time line.

The implementation of the system is divided into the following modules. Contact management module, Voice call module, Sending Voice message module, sending text message module, Make conference calls module, File sharing module.

When the contact person is Online (within the same Wi-Fi range) then their device replays true, that contact is saved with indicating the online presence and display it to the user by showing their online presence. The user has to refresh the contact to check the current status of users because at the same time other user can enter in to the network or exit from the network.

After getting the available contacts, user can make the call by pressing the contact once. Then to send the message the user has to long press the contact and have to select text message option and type the message and select send button. To send the voice message again he has to long press the contact and select voice message option, the user has to hold the button to record the voice once the user releases the button the recorded voice will send to the receiver.

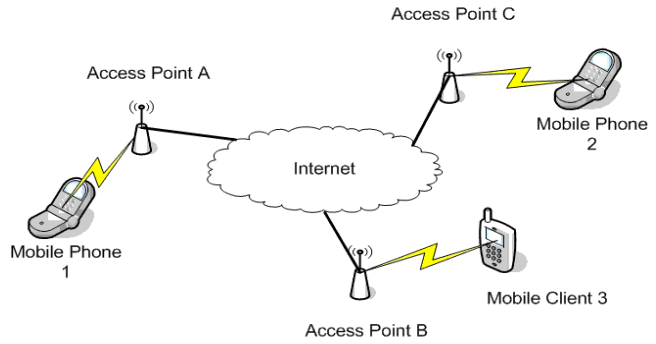

Fig. 5: Architecture diagram of proposed system.

To make conference call the user has to select the contacts from contact list with whom he wanted to start conference call. After selecting multiple contacts, the user has to press group call button to send call initiation signals to all selected contacts (by using Wi-Fi signal as a media) then receiver phone gets ring. By pressing answer button, they can talk with multiple users.

When the user wants to share any file, the sharing can be done by long press on the contact and select the share option. Then the window shows all the files present in the phone memory or SD card in that the user has to select the file, which he wanted to share. Then that file is read by the system and by pressing the share button that file will transfer to the receiver.

4. EXPERIMENTAL RESULTS

4.1 Results

Today without communication we can't think of living. We communicate through various mediums like face-to-face conversation, electronic mails, letters etc. One of the most important communication mediums today is a mobile. These days almost everyone is having mobile in their pocket which is just not limited to be used as a communication device but are the multimedia set which is like small pc in hand. As the Android has taken up the considerable amount of mobile market and due to it's being an open platform it is attracting most of the developers towards it. As it is totally based on java and many developers today are familiar with java it is very easy to develop an android app. Developing android app only requires new ideas and imagination, which can be helpful to someone. Whenever one makes a call to someone it cost money. In our daily life we often face situation where we want to contact a person, which is in same premises. If the premises are large then where all one will find that person and, in that case, we will call him but it will cost. Today almost every premise is Wi-Fi enabled and knowing the fact that most of the people are having Android sets an application can be developed through which we can communicate with other person in same network thus saving our money.

In this project we are enabling the calling mechanisms, Messaging modules, with the help of Wi-Fi, we can communicate with other user who is in the range for transmission of data.

The proposed system uses Wi-Fi router as a medium to communicate with a voice without any service provider, i.e. free of user costs, which eliminates various issues such as range coverage, call costs, etc. Even this application gives user flexibility by allowing him to retrieve his message when he was unable to receive a call afterwards. The system is cost-efficient as Wi-Fi is developed for internet access and we are expanding its use. Lastly, this application is immensely useful where communication is essential and very often takes place.

Figure 7 shows the cost comparison between telecom providers and VOIP call

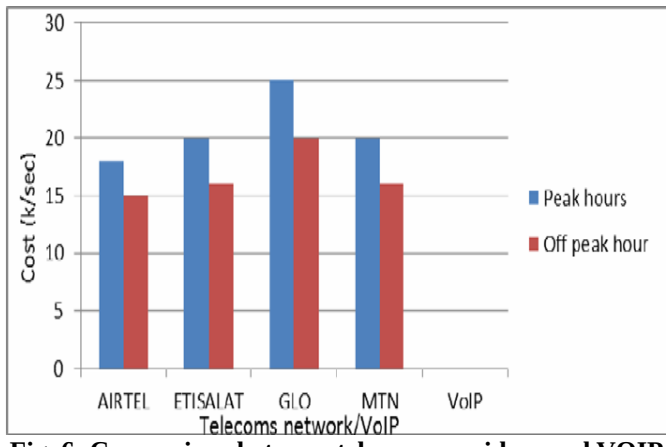

Fig. 6: Comparison between telecom providers and VOIP call

Fig. 7: Main window

Figure 8 shows main window of our proposed system, which includes all modules.

5. CONCLUSION

After thorough analysis of the existing system and its drawbacks, we concluded that the proposed system is much better and convenient to use. The practicality of the implementation lies in the fact that the load on the Wi-Fi connection becomes increase, if all the users use this application concurrently. So, by connecting the greater number of antennas we can reduce the connectivity problem.

6. FUTURE WORK

This system can be further enhanced using various techniques. Better user interface, Video call facility, Improving the Wi-Fi signaling to reduce the noise in the voice conversation will be developed

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