Android Application For Audio Conference Using IEEE 802.11

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Abstract *Networking has been the most important technology in human history. There are several ways of communicating through network. Topologies where developed in order to communicate efficiently. WIFI plays a crucial role in nowadays network. This proposed work describes the live audio broadcasting through WIFI network make effective utilization of short ranged communication systems. This paper presence a new audio broadcasting system based on wireless network and the data are transmitted through WIFI. Android application is developed in order to broadcast live audio streaming using User Datagram Protocol (UDP). The purpose of this experiment is to find better ways of utilizing sharing of data through WIFI network. The purposed system is developed using android version 3.3 which was java programming language. Using these application users can speak with each other via half duplex methodology. The detailed audio broadcasting through WIFI networks are demonstrated in this paper.*

Keyword: *Networking, Audio broadcasting, WIFI Network, WIFI.*

1. INTRODUCTION

Network is backbone of communication technology. Networking aims to provide quality communication with multiple clients. Topologies are used to control the network structure. Different topologies provide different structures such as Bus topology, Ring topology, Star topology, etc. Smart phone technology is widely used all around the globe which uses networks in order to communicate with one another. Statistics says 730.7 million people in India using smart phones which default consists of wireless fidelity and hotspot connections. Wireless network con-

nections are used nowadays, in order to minimize the cost and to establish continuous connection to a moving object such as mobile phone. Reason for network implementation is to share information. Smartphones is one the common medium everyone uses to share information. WIFI network is used by every smartphone users to share data between them. Nowadays using WIFI, data such as audio, video, zip files, etc…, can be shared. Enhancing this ability, the live data sharing can be done.

This provides a short range communication which is completely independent of the mobile network. Since WIFI and mobile network are completely independent of each other. The Wi-Fi security protocol currently in use is WPA2 PSK (Wi-Fi Protected Access 2 – Pre-Shared Key), which is the security provided for the proposed application. This system consists of API level 21, User Datagram Protocol (UDP)

used for network communication, divider is used to split the payload and user friendly GUI. Which uses WIFI or hotspot to share information. Even though UDP is unreliable but faster than TCP. So by using UDP, fast transmission of information in WIFI network can be achieved. In order to minimize the latency between the packets UDP is preferred over TCP.

2. EXISTING SYSTEM
2.1 Arduino Based Wi-Fi Enabled Wireless Speaker

This work mainly tells about the transmission of audio from the computer to the Wi-Fi connected speakers. If we play music in the computer, sound will come from the connected Wi-Fi speakers. For ex: we can use it in party setting ,if one plays a music in the computer in a room ,with the help of Wi-Fi connected speakers we can hear the music inside the house.so we can keep the computer in the locked room for safety purpose. This system contains Microcontroller receiver module (AT Mega 328p) and computer program used to send audio data [1]. In Arduino, we can connect CPU board to various interchangeable add on shields. Audio was transmitted over 802.11 protocols using PC with wireless LAN. Data has been received using wireless LAN module.
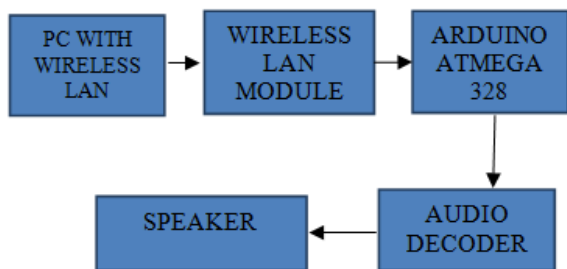

Figure 1 Block Diagram of wireless speaker

Using Arduino controller, the received data has been passed. To get the specified audio format, we use audio decoder with speaker which receives data from arduino controller. By using the arduino the system was well enhanced with better audio quality by considering the small buffer limitations of the microcontroller and could recover from seconds of lost for this period of time. The system is further more relatively robust. By using the microcontroller with on board RAM will increase the audio buffer for long period of time, which will decrease the receiver sensitivity. In this system, the device will support more file formats which was allowed to play in the computer. In future, the system was enhanced by using microcontroller inherited with Wi-Fi module. The block diagram is shown in Figure 1.

2.2 Indoor Mobile Localization Based On Wi-Fi Fingerprint's Important Access Point

This work says that on basis of important access point (IAP), Wi-Fi fingerprint localization method is used. The important access point is that the Wi-Fi access point with the received signal strength which is used for the Wi-Fi fingerprint. Here, from the database, fingerprints are picked with the same IAP which is said to be the estimated fingerprint. The similarity degree is determined by the distance and the AP repetition estimated location is calculated by the fingerprint location which gets matched up with the estimated fingerprint. PS is not used in indoor environments as it issues accurate and reliable position information .researches found many localization techniques such as RFID, Wi-Fi etc. to overcome this drawbacks. Wi-Fi based indoor positioning has two divisions. Both the division has the localization algorithms, where first division is based on signal propagation model and second division based on position fingerprints [2]. The block diagram of indoor mobile localization is shown in Figure 2.
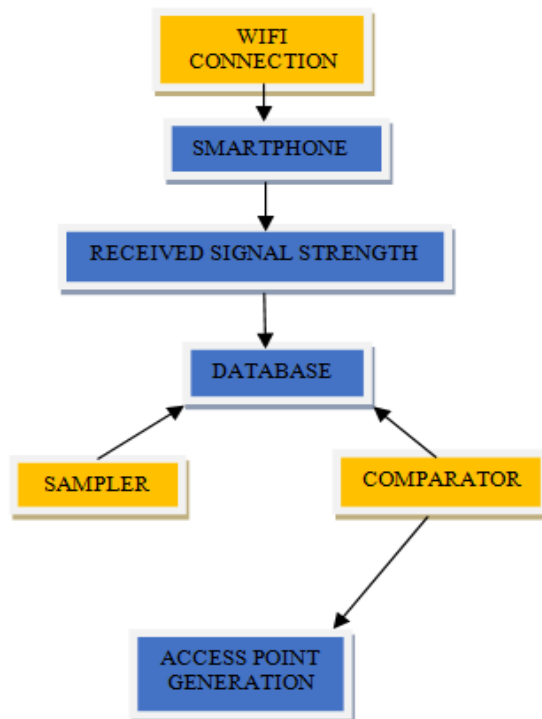

Figure 2 Block Diagram

The measured signal strength is converted into distance information using signal propagation model. By using distance between the moving target and multiple access point, the target coordinates can be calculated. Wi-Fi signal is harmed to environmental factors such as walls, doors, etc. in transmission of signal. The fingerprint localization algorithm has two parts. They are offline establishment of location-fingerprint database and online processing. From this

project, we can identify mobile phones wherever it may be. The disadvantage is that as the fingerprints distance is increased, the range of fingerprint matching is reduced [3].

2.3 Authentication Based Wi-Fi Calling For Mobile Phones

In this work, we discuss about the cell phones with WIFI and their communication inside WLAN. This is the form of telecommunication where the data is sent to large interconnected networks. Two persons communicate through 2.4GHZ communication channel with WIFI Enabled and J2ME platform. To call one person, the user will send packets to router and then will identify the client [4].

By using UNC, Wi-Fi server turns the call to GSM. By using communication channel with cryptography techniques, we can overcome the channel being affected by hacking. In this network delivery ratio and the total number of messages are generated. The second performance metrics is message dissemination scope. The third performance metrics is average delay which is the average time of delivered messages. And the last metrics is the energy consumption which is the ratio of total energy in PSN to number of human carried phones. The block diagram for Wi-Fi calling is shown in Figure 3.
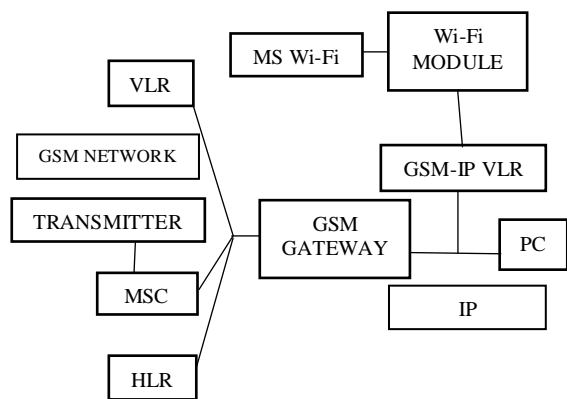

Figure 3 Block Diagram

The algorithm used in the system is shortest path algorithm and novel algorithm. Cost is involved in initial stage only and then free for all other networks. Based on multi hop networks, the model is extended for multi-channel, multiple interference.

2.4 Energy Efficient Phone -To- Phone Communication Based On Wifi Hotspot in PSN

The system is based on pocket switched networks (PSN), which utilize both human mobility and occasional connectivity to transfer messages between mobile human devices [6].

Nowadays large number of mobile phones has come into daily lives. Therefore in the paper they proposed that the Wi-Fi hotspot mode of a mobile phone is applied in the PSN, in order to realize the phone to phone communication. The illustration of the energy efficient system is shown in Figure 4.
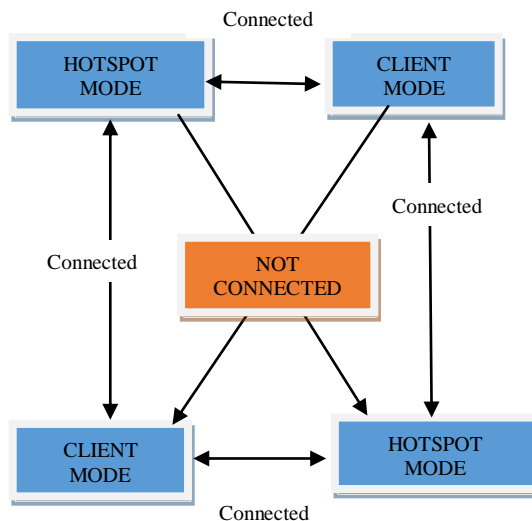

Figure 4 Energy Efficient System

In Wi-Fi Hotspot mode the phone will rapidly consume energy and the battery life will be shortening significantly. The message discrimination scope can be maximized within the limited energy constraint of each phone is PSN. The phone is switched between hotspot modes on the basis of energy efficient phone to phone communication method [7].

The best performance can be achieved by energy consumption and message dissemination among different switch strategies .the communication can be possible if one is in the hotspot mode and other in client mode .the energy consumption will reduce the battery of phone in absence of energy supply. We use scheduling strategies to switch phone between two modes .this will show best performance [8].

2.5 Dark Side Of Operational Wi-Fi Calling Services

In this paper, they are subjected to better Volte (voice over LTE) and VoIP services. They give us a technique called 3GPP IMS (IP multimedia sub system) to place cellular calls over WIFI network [9].This mechanism is same as Volte, which include SIM based security, IPSEC (Internet Protocol Security), 3GPP AKA (Authentication and Key Agreement).Without cellular base stations mobile users can send/receive messages and calls with use of WIFI networks[10]. .The block diagram of Wi-Fi calling devices is shown in Figure 5.
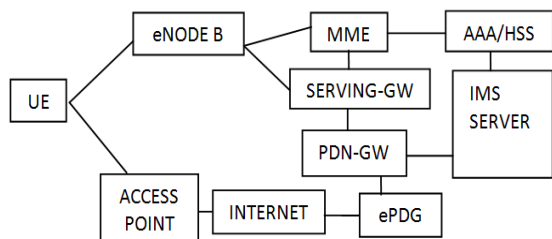
Figure 5 Block Diagram of Wi-Fi calling services

The defects in Wi-Fi calling devices are by four vulnerabilities. From these vulnerabilities they give us two proof-of-concept affects. The two proof-of-concept attacks are user privacy leakage and telephony harassment or denial of voice service attack (THDoS) [11].

3. PROPOSED SYSTEM

This android application is developed with android development version 3.3 which uses java as the programming language. The utilization of technology to its maximum is necessary to provide efficient output required. In order to establish communication within short range say for example an office, a massive amount of money will be spend in order to establish a network where all the employees are connected. And with which the sharing of information is done through landline telephones. In security cases the policemen in a certain region are connected through walkie-talkies. It costs so high and has given to be individual to all policemen who are in the field. So in this proposed work an android application is developed which is able to:

Eradicate the usage communication devices such as walkie-talkies and landline telephones. Utilization of the Wi-Fi data sharing can be updated. Any modification in the android smart phones is not required (suitable for any android above version 5).Supports any form of wireless fidelity such as MODEM, routers, hotspots, etc.

The block diagram of the proposed system is shown in Figure 6. In this proposed system live audio conference through Wi-Fi network can be done using an android application. This system is developed using android 3.3, the protocol used in this system to transmit data or packets is UDP. The processor which is default in the smart phone is connected to a Wi-Fi network. The network can be of any form of wireless fidelity. Notification will be given to individual users before the conference starts. After attaining the necessary information from all the individual users the conference takes place. This system can reduce the usage of external short range communicating devices.

The working of this proposed technique is illustrated as follows: The default processor in the smart phone is connected to the wireless fidelity. After establishing the connection the graphical user interface is given to the user, to identify the application. Once the user identified the application the API (application protocol interface) will fetch the necessary data from the memory. Then depending upon the users, payload checker will intimate the data required for each packets to transmit. SDK is used to identify the versions of each users android versions and adjust the packets for all the other users. Using transmitter the packets are transmitted via network protocol UDP. Then according the requirement of individual user the packets are divided using payload divider.
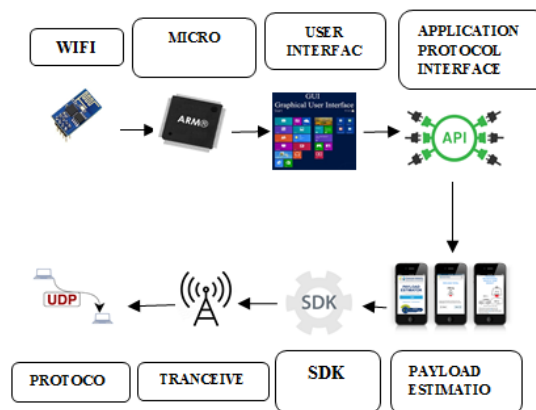

Figure 6 Block Diagram of Proposed System

Then the other clients in the network will receive the packets instantly with minimum delay. The proposed system uses the concepts of nearby connections and Wi-Fi direct. Wi-Fi direct is used to provide a network configuration between devices and nearby connection is used to share the data or information through Wi-Fi. The application becomes active once the hosting person or the user connected to a simple Wi-Fi network. Different types of processors are used in smart phones. The processor is used to perform all the functions of the smart phone.

In order to give the user a friendly and easier interface GUI is used. User selects the application via graphical user interface (GUI). Searching through the screen the application can be found. After the user selected the application a certain protocol will be turned on in order to start the application which is known as API (Application Protocol Interface). API fetches the required data to start the application. Then the connection between every user to every other user in the network is done by the application depending upon their version of androids. This is preprogrammed using software development kit where the connection between the users are developed using java programming. Once the connection is made then the payloads can be calculated.

If the connection is not made then it will exit and after timeout it will try again to connect into the network. Then depending on the users requirements the packets of data are divided. To divide the data, Payload divider (also known as demultiplexer). Here single input is converted into multiple outputs in order to transmit to all the users in the network. Once the packets are divided the transmission of the packet takes place. A simple transmitting action based on nearby connection is done i.e., the packets are transmitted using Wi-Fi antenna in the smart phone. In order to transmit data between layers UDP (User Datagram Protocol) is used.

4. MATERIALS&METHODS

4.1 Smart Phones

First smartphone is IBMs Simon, smart phone is used for sending email and faxes. And also used for calling and messaging. They also have network connection for downloading data. Internet communication is provided in smart phones which is used to download datas. They are provided with cameras to take photos such as selfies etc.. Nowadays to improve performance and to improve efficiency snapdragon processor is used and soon will be updated based on upcoming versions. Commonly used versions these days are lollipop, marshmallow, nougat and Oreo.

4.2 Android 3.3

Android version 3.3 is used to develop applications nowadays. Programming language used in this platform is JAVA. Java is a programming language used in front end and back end of SDK tool. SDK stands for Software Development Kit and it is used to create software of all kind. The maximum SDK level used nowadays is 21 and soon to be updated. Using SDK a certain protocols are called in order to maintain efficient function of the software. In essence of application API is called. API stands for Application Protocol Interface which is used to fetch the necessary information from the memory to the application.

4.3 Wi-Fi Modem

The common standards for Wireless Fidelity over the globe is known as IEEE 802.11.They are different modes of Wi-Fi are developed for the past years. Hotspot is one of them which is used in Smart Mobile Phones to share data's with those who connected in the network. Maximum members can be connected through the Hotspot is 16 members. Modem is used for larger number of participants in the network. Mostly used large scale industries or corporate companies and also small scale industries with members more than 100 client or participants are connected in the network to share data.

Wi-Fi module is used to communicate between two machines which is also known as IoT (Internet of Things).Here devices are connected in the Wi-Fi network through which the commands are passed between them. Hence the operations will be performed by the devices connected in the network. The cost of Wi-Fi module is low so most of IoT automated home appliances using Wi-Fi module. The WIFI access for this application may be in any form such as a module or a hotspot from a mobile phone or a MODEM. Depending on the type of network the user can be name as client or admin. If the user produces the WIFI then he will be admin otherwise he will be considered as a client.

Figure 7 Wireless Fidelity Module

5. SIMULATION OUTPUT

Android studio is the well-known platform for developing applications for Android smartphones. One of the reasons why this platform is used because it can use multiple programming languages. Most of the application is created using Android Java and front end is created using XML. Data base is created using SQL. The android studio provide user with necessary information while coding. These information will be shown in a list where user can pick one for his need.
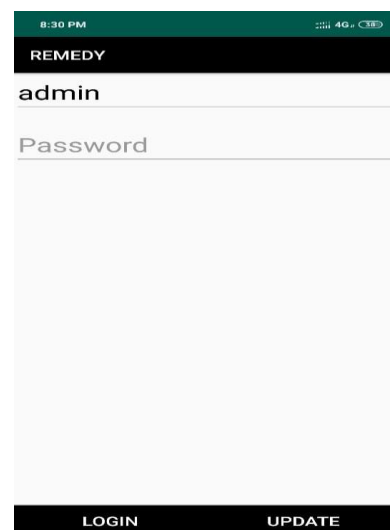

Figure 8 First Page (Login)

Java is a programming language used to create or develop software and application all around the world.

Even though it is a old programming language, due to its user-friendly interface and frequent updates made Java, the most commonly used programming Language of all time. Java is class based object oriented programming language. Since Java uses both interpreter and compiler the output efficiency gradually increased. The login type is shown in Figure 8. First page is used to admin login to the application which is provided. Admin is logged in after typing the password. The Password which can updated is shown in Figure 9.
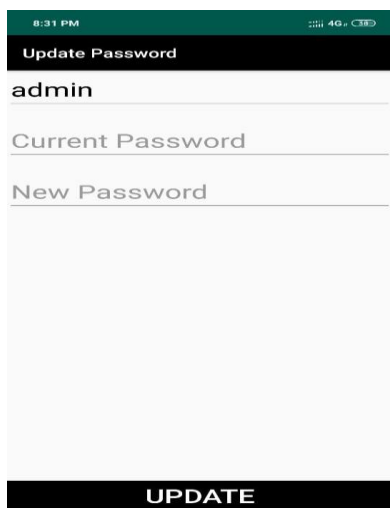
Figure 9 Second Page (Update)

Figure: 10 Third Page (Name)

Using this update option, the admin can change the password by typing the current password and the new password which is to be updated. Group members who all are needed to login are logged in by a username which is to be created by themselves.
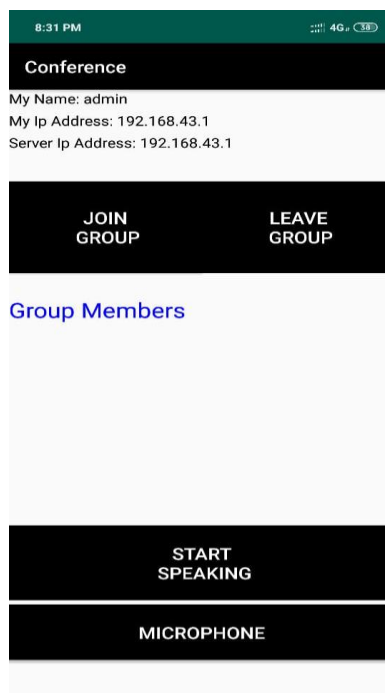
Figure 11 Fourth Page (Conference)

By clicking the JOIN GROUP ,the members are joined in the group.By using MICROPHONE option, we can hear the conference using Headset.By using LOUDSPEAKER option,we can hear the conference directly.
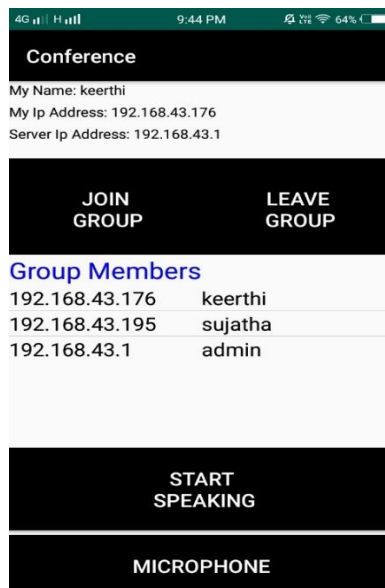
Figure 12 Fifth Page (Utility)

The group members are joined in the above figure.5.5.The maximum members that can be connected are 200 members. The member who is speaking is shown in Figure 13.
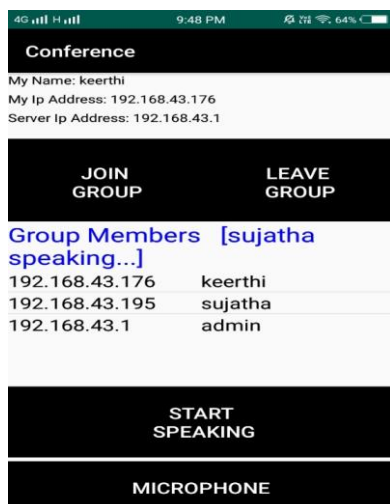
Figure 13 Sixth Page (Identity)

After the admin who need to start the conference will start to talk and group members will be connected. After the admin stopped talking others who need to talk will click the Start to speak button and start talking. If any unwanted member to be removed the admin can do this by using the option which is provided.

6. CONCLUSION

After examining the papers on experimental investigation of live audio broadcasting, a new android application based on wi-fi direct and nearby connection for establishing live audio conference through wi-fi (IEEE 802.11) is proposed. This system utilizes and enhances the performance of wi-fi and also data sharing. The future enhancements are given below:

Multiple conferences in a same network can be done. Transmission control protocol can be implemented for better quality of audio. Recording the conference can be done. Voice notification can be implemented.

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