International Journal of Advances in Computer Science and Technology

Multi Users Text Communication (with new ideas for more utilization) using Android Smartphone Bluetooth Connection

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ABSTRACT

Bluetooth connection has many advantages over Wi-Fi and Cell Phone service Providers like cost and power efficiency. This application utilize android Bluetooth device for communication task.

The project concentrates not only on providing user with the communication ability, but also provide the extreme utilization idea which can be add to such application like:-

- **Baby Monitor:** with this idea the application can monitor the sleeping baby status, detect voice (in case of cry or wakeup), and send alarm to mother device which is in the same building rang.
- **Save Chat Session to Local History File:** this feature is the most wanted by chatting application user. As most of current chat application store the sessions in the application cache storage or in service provider server, thus there is no backup ability. by using local file the user will be able to view his old chatting sessions even in case of reinstall the application for any reason.

Keywords: *Wi-fi vs. Bluetooth, Existing system, Scanning for other bluetooth devices, Paired bluetooth devices, RFCOMM channels/sockets, Transferring data*

1. INTRODUCTION

The Android platform support for the Bluetooth network stack. It allows a device to wirelessly exchange data with other Bluetooth devices. The new vitality to the mobile space has injected because of the release of Android smart platform. Android is an operating system based on Linux kernel. It is designed for the touch screen mobile devices. The user interface of Android is based on direct manipulation. The Android system provides many Bluetooth APIs for developers to call. Bluetooth technology allows users to exchange voice and data transmission between two or more devices. It is basically a wireless communication technology. Bluetooth technology is reflected in the low price, easy to control and non-visual distance limitations. Bluetooth is integrated into the android platform as an android mobile network communication module. Chat room is used to connect the Android phones into a local area network. It helps to communicate with each other. There are many versions of android OS. Most the current Bluetooth chat applications is either not supports resent version of android or they have so many defect which make these applications not woke after installation from Google play market. The application we are about her is developed to supports up to lollipop version of android. And it is tested for any expected defect .the application is start by asking to turn the Bluetooth device ON (if it is not turned already) . then the user have to tap the search icon in the top of the main screen .the application will search for the devices in the surrounding area and list these devices to the user . the user must identify the other application user by the help of device Bluetooth name. After selection of the user to be connected with, the application will ask to do the pairing process for connect both user devices to gather. Now the two devices are connected and can send text to each other. For sending text a user can write the message to be send in a text box which is appear in the bottom of the main screen. The send button is placed beside the textbox when the user press the send button then the application will start the sending process. The sending operation use the Bluetooth socket which is decided by the application and then send using the Bluetooth protocol. On the other side the receiver have a special application thread that always listen to the Bluetooth socket for any incoming massage. The massage sender is already identified by his Bluetooth device name which will be used in the message display text view where the entire sent and received message will be listed merged with sender and receiver name. Many devices can be added to the chat session where all of these devices can send and receive in the same time. Next I will list the steps of how the application work or how the application can be used.

1.1.1 Wi-Fi vs. Bluetooth

Wi-Fi devices tend to interfere with signaling of surrounding devices which can prove quite harmful when dealing with certain sophisticated and life saving devices(such as in a medical environment).In addition to this, Wi-Fi technology requires comparatively more power and also other devices: Wi-Fi Router, Wi-Fi Modem, Wi-Fi Hotspot.

On the other hand, Bluetooth requires low power resulting in longer battery life. It can be used within the range of 30-feet, which is reasonable within a small building. The data-transfer rate of the Bluetooth technology is quite acceptable, i.e. 721Kbps. It is readily available since it's in-built in every Android phones and moreover the cost of setting up a Bluetooth network is much less in comparison to that of Wi-Fi.

Hence for all the aforesaid reasons we chose Bluetooth over Wi-Fi as our medium of communication.

Apart from general messaging between to users, the application also has an additional feature which allows users to save their chat history to an Android based server for storage thus not crunching on the phone memory as well

1.1.2 Utilities Added With This Application

Because the Bluetooth is widely available and need no work to be done by any technical support people. So we can add several ideas to be helpful more than a simple text chat application. Some of the feature are directed to solve problem in short rang distance. Here is a list of some of my ideas:

I. **Baby monitor:** it's the idea of enable the house wife (mother) able to know if her new borne baby is waked up while she doing some work in other place within the house. The idea is to use tow android phone put one near to the baby and the second will be with the mother. Then we can use the phone mic to detect any voice near to the baby (crying voice) and send special message to mother phone. The application will detect that message and start sounding to alarm the mam.

II. **Save chat session to text file :** this feature is not supported by any chat application but it is most wanted by chat user now day.

2. EXISTING SYSTEM

Chatting is sharing texts via a server. Everybody knows how to chat on Facebook, yahoo and Google+, but these services require a data connection to reach their servers and for successful chat you will definitely need a connection. Now days we can say that all the existing chat system is depends on chat server- client architecture which is costly to construct and need Wi-Fi connection to the internet. Chat server usually implemented by an organization and need so many professionals specialist to run and maintain the server.
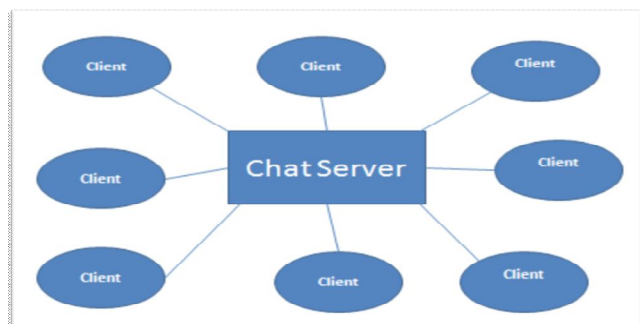

Figure1. Chat server architecture

If two user sitting in the same home (building) they will be able to connect only if they have data connection which is not necessary available all the time. Moreover the data connection is money consumer thus, even for two user in same house we have to spend some money for the connection.

3. PROPOSED SYSTEM

This is a Bluetooth messaging app you can connect and send messages to other android devices and see Bluetooth compatible devices around you. No GSM or Wi-Fi connection required all you need is two Bluetooth compatible android devices in range of each other and you can text away. To chat with a user, select it from the list and press 'Ping' to send a welcome message. The other user may do the same. As the welcome message is displayed, use right or left soft key to accept or reject the chat session. Once the session is accepted, the chat starts with colorful text to differentiate users. In addition to this person-to-person chat, chat rooms can be used to gather a number of buddies.

Advantage of the proposes system

I. All peers that want to communicate only should have Bluetooth chat running.
II. It is enough that one peer does the initial "look for friends" operation.
III. Every time a new comer peer does its first "Look for friends" operation, the operation will reorganize all initial communication and profile sharing stuff.
IV. Every peer will have an updated list of profiles around automatically and the profile list will be displayed to warn everyone about the new comer.
V. No need for data connection.
VI. No cost.

4. MODULES

In this application the following modules are used:

1. Scanning for other Bluetooth devices
2. Querying the local Bluetooth adapter for paired Bluetooth devices
3. Establishing RFCOMM channels/sockets
4. Connecting to a remote device
5. Transferring data over Bluetooth

4.1. Scanning for other Bluetooth devices

This application begins searching for devices as soon as it is opened. Options menu appear only after a successful or unsuccessful search is complete. Other options are new message alert - vibrate or sound, and refresh rate setting ranging from 30 seconds to three minutes. Users can

manually refresh the list of users as well. Select a user from the list and use Options.

4.2. Querying the local Bluetooth adapter for paired Bluetooth devices

The Bluetooth Adapter is the entry-point for all Bluetooth interaction. Using this, you can discover other Bluetooth devices, query a list of bonded (paired) devices, instantiate a BluetoothDevice using a known MAC address, and create a BluetoothServerSocket to listen for communications from other devices. Use this to request a connection with a remote device through a BluetoothSocket or query information about the device such as its name, address, class, and bonding state. Represents the interface for a Bluetooth socket (similar to a TCP Socket). This is the connection point that allows an application to exchange data with another Bluetooth device via InputStream and OutputStream.

4.3. Establishing RFCOMM channels/sockets

In the socket programming model, a socket represents an endpoint of a communication channel. Sockets are not connected when they are first created, and are useless until a call to either connect (client application) or accept (server application) completes successfully. Once a socket is connected, it can be used to send and receive data until the connection fails due to link error or user termination.

An RFCOMM BluetoothSocket used to accept incoming connections must be attached to operating system resources with the bind method. bind takes in a tuple specifying the address of the local Bluetooth adapter to use and a port number to listen on. Usually, there is only one local Bluetooth adapter or it doesn't matter which one to use, so the empty string indicates that any local Bluetooth adapter is acceptable. Once a socket is bound, a call to listen puts the socket into listening mode and it is then ready to accept incoming connections.

4.4. Connecting to a remote device

You must request the BLUETOOTH permission in order to perform any Bluetooth communication, such as requesting a connection, accepting a connection, and transferring data. Before your application can communicate over Bluetooth, you need to verify that Bluetooth is supported on the device, and if so, ensure that it is enabled. you need to ensure that Bluetooth is enabled. A dialog will appear requesting user permission to enable Bluetooth. Once a connection is made with a remote device for the first time, a pairing request is automatically presented to the user. When a device is paired, the basic information about that device (such as the device name, class, and MAC address) is saved and can be read using the Bluetooth APIs. Using the known MAC address for a remote device, a connection can be initiated with it at any time without performing discovery (assuming the device is within range).

4.5. Transferring data over Bluetooth

Check the manual that came with your cellular phone and read the section on Bluetooth capabilities to see if your phone has a Bluetooth password. Note down the password. Power on your cellular phone and access the "Settings" option in the main menu. Choose the "Bluetooth" option if it is immediately available, or choose "Connections" and then "Bluetooth." Press the option for "Activate Bluetooth." Enter in the Bluetooth code that you noted down before if your phone prompts you for one, or instead enter the standard code of "1111" if you don't have your manual and aren't sure what the password is. Repeat the process on the second phone. Navigate to the folder on your phone that holds the file you want to transfer. Choose the file and then choose the option to "Send." Press the option to "Send to Phone" and then press the button to send to a connected Bluetooth phone. Enter in the phone number of the other phone if your cell does not prompt you to send to an activated Bluetooth phone in range

5. DESIGN OF BABY MONITOR

The baby monitor idea is work by set one android device (monitor device) near to the baby and the second device must be with the mother (alarm device).by setting the monitoring option to ON then the monitoring device will keep monitor the baby or any noise nearby .
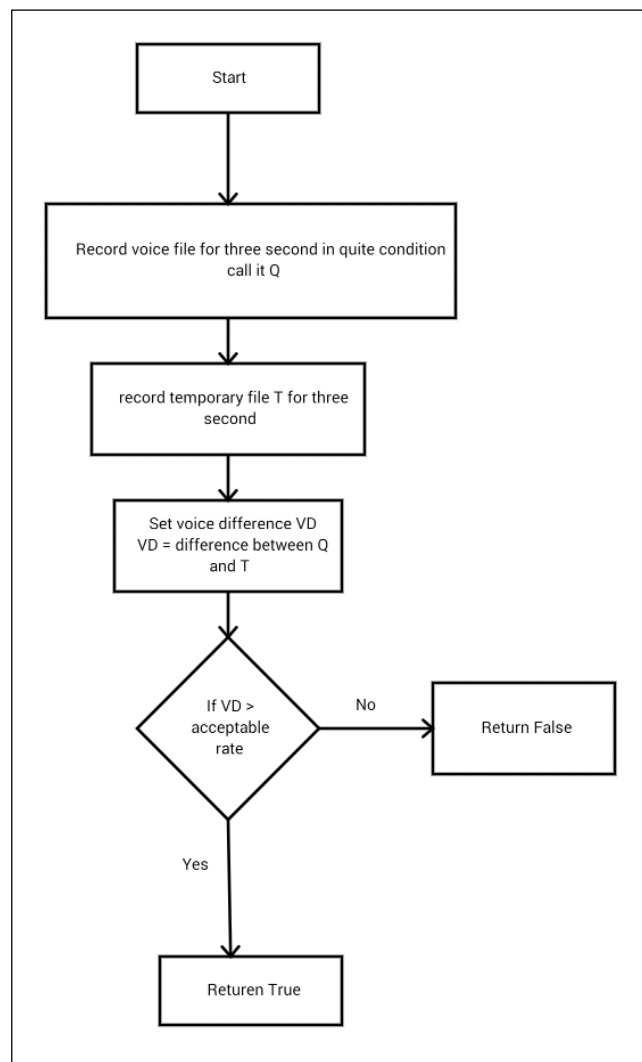The idea is as follow:-

5.1. Monitoring process

- check for any noise (laod voice)
- if any laod voice is detected then send alarm message to the alarm device
- if voice in same state (no laod detected) then just keep checking

the idea is well defined in the next figure:
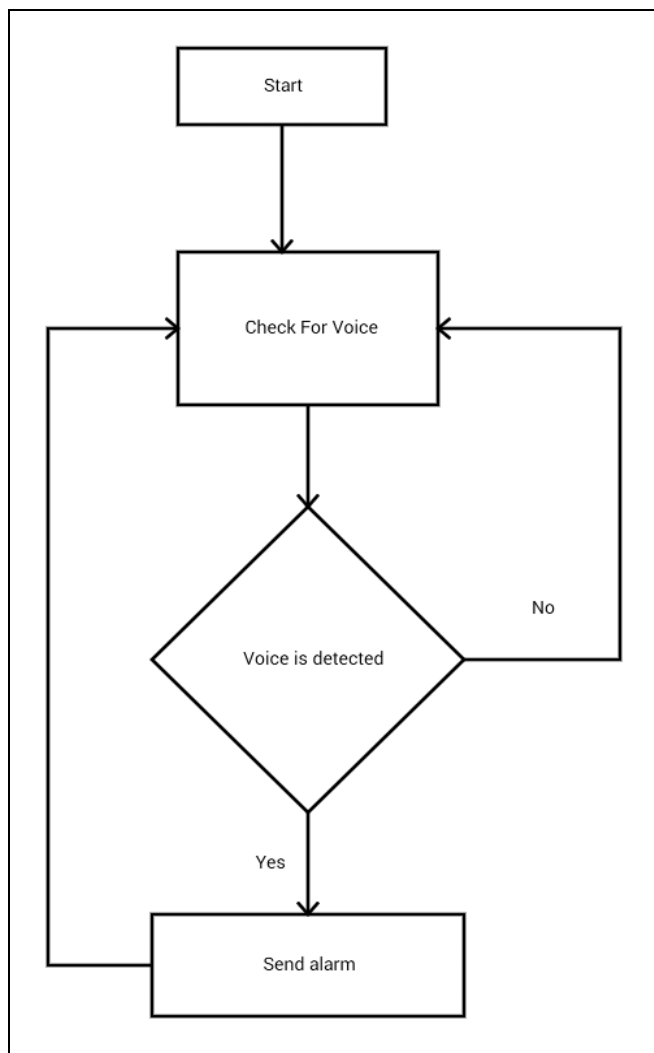
Figure.2. Monitoring Process

Figure.3. Simple Voice Detecting

5.2. How to Detect Voice

The idea of voice detection can be implemented by several ways like stream and frequency detection. here we use very simple idea. we record one file in quit condition and keep checking y record temporary files .if suddenly a temporary file structure is too different that mean the voice is changed in the environment. The steps are as follow:-

- ask the user to command the application to start only if the environment is quite and record voice file for three seconds name it Q
- keep detecting by record temporary file for three seconds call it T
- set the VOICE DIFFERENT RATE call it VD
- if VD is very high then return TRUE else return FALS

6. SAVE CHAT SESSIONS IN TO LOCAL HISTORY FILE

In android storage is divided into two type:

Internal Storage

You can save files directly on the device's internal storage. By default, files saved to the internal storage are private to your application and other applications cannot access them (nor can the user). When the user uninstalls your application, these files are removed.

External Storage

Every Android-compatible device supports a shared "external storage" that you can use to save files. This can be a removable storage media (such as an SD card) or an internal (non-removable) storage. Files saved to the external storage are world-readable and can be modified by the user when they enable USB mass storage to transfer files on a computer.

In our case external storage is typical. the idea is to use one of public directories such as media or document folder to store chat sessions as a text file that can be accessible by user even in case of uninstall the application. Furthermore user can access this file when he connects the phone to personal PC. This user will be able to restore his data even in case of changing the smartphone device.

7. CONCLUSIONS

Bluetooth technology allows two devices near each other to communicate at a maximum speed of 3 Mb per second. In the grand scheme of wireless communication, Bluetooth is roughly two times faster than the data throughput of a 3G wireless phone but still 10 to 20 times slower than today's Wi-Fi speeds. This is an optional step to provide additional information to other chat buddies. Next, select 'Look for Friends' option which attempts to discover other users in the area. Detected user-profiles are listed as selectable boxes. While a profile is selected, Options menu can be used to view profile details, initiate a file transfer or to refresh list of detected friends.

8. FUTURE WORK

Here is a list of future work can be added:-

Use PC Keyboard
Using PC keyboard is a good idea for smartphone user. Where the keyboard size and usage is a real problem for smartphone users. This idea can be implemented by setting up temporary file on mobile storge set that file to be accessible by both Android and PC .then use some protocol such that Key strok on PC is written to that file and android is read the file content as keyboard input.

Voice Call
Same application can be developed to transfer voice. This ability will enable user to do voice call by help of phone microphone

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