

Portable Bluetooth Microphone App

Arati Nayak¹, Ambika Bhat², Divya Kulkarni³, Gayathri Alli⁴, Nidhi Shahapurkar⁵

¹⁻⁵Department of Information Science and Engineering, SDM College of Engineering and Technology, Dharwad.

Abstract - In the 21st century people have small gatherings very often, where they use mics and music systems such as in Indian pre-wedding rituals, fresher's parties etc. Microphones are costly and wired large speakers are heavy to carry. "The Portable mic application" helps to communicate with the people by using the application as a microphone that pairs with Bluetooth speakers to output the sound signals received from the microphone.

Key Words: Bluetooth, Microphone, Wireless, Speaker, Android

1. INTRODUCTION

The Android platform includes support for the Bluetooth network stack, which allows a tool to wirelessly exchange data with other Bluetooth devices. The application framework provides access to Bluetooth functionality through the Android Bluetooth APIs. These APIs let applications wirelessly hook up with other Bluetooth devices, enabling point-to-point and multi-point wireless features. Microphones are costly and wired large speakers are heavy to carry and cause disturbance to surrounding with their loud noise. Today Bluetooth is an exclusive feature available in most devices such as smartphones and tablets. Recent models generally use Bluetooth 4.0 or maybe Bluetooth 5, and wireless speakers generally have a variety of 10 meters. This application helps in less power consumption as Bluetooth is energy efficient and helps to eliminate the large speakers and wiring of high-power music systems which is of no use for small gatherings. There are four major tasks necessary to communicate with Bluetooth devices: setting up Bluetooth, finding devices that are either paired or available in the local area, connecting devices, and transferring data between devices. Classic Bluetooth is the right choice for more battery-intensive operations, which include streaming and communicating between Android devices. Microphones and speakers are used in many applications such as telephones, hearing aids, public address systems for concert halls and public events, etc. Microphones typically need to be connected to a preamplifier before the signal can be recorded or reproduced and speakers consume a large power due to its technical specifications. One of the advantages of Bluetooth is that it is easy for even non-technical people to use effectively. It is a replacement for cabling in various personally carried applications in any setting and also works for fixed location applications such as smart energy functionality in the home (thermostats, etc.).

A Bluetooth microphone is a wireless microphone for

PC Audio, PA Systems or camera accessories. It's also commonly used in education, webinar, conference and more. There are currently not many Bluetooth microphones on the market. Bluetooth Loudspeaker app is to wirelessly connect your phone to a Bluetooth speaker or connect to an amplified speaker or PC. That is, your Android device becomes the microphone and the Bluetooth speaker becomes a remote loudspeaker.

Basically, a speaker converts signals (voltage spikes) to sound (by vibration of membrane) and microphone, convert sound into signals. This can be used in street performance, to sing karaoke, small celebrations, classrooms etc. Hence, developing an app that uses in-built a microphone mobile and connects it to a Bluetooth speaker uses less power and helps us to avoid bulky speakers which have heavy wiring. The purpose of building this application is to gain knowledge about Bluetooth technology and to explore other related interfaces. This application fulfills the purpose of low power consumption, zero wirings on the stage, and saves manpower. The basic components of a karaoke module include the microphones, the processing unit, and the speakers. The system processes the signals through two paths, mixes them and plays the output through the speakers. Karaoke is now available for Android, iPhone and other playback devices at many internet storefronts. This module is designed to play music (karaoke) and this even syncs with the audio module that is simultaneously a song and our voice can be heard through the speaker.

2. EXISTING SYSTEM

In large functions or gatherings, we see people use wired speakers to address people or to make any announcements. High power consumption, carrying them and Cables all-around form the main disadvantage of using wired speakers.

3. LITERATURE REVIEW

The authors [1] have developed and described an application for programmable personal mobile communication devices which is useful for people to attend meetings, conferences, classrooms. It allows the user to act either as a moderator or host of a meeting in one case or as an attendee/participant of the meeting in another.

The authors [2] have studied various scheduling algorithms, since it has a direct impact on the transmission performance of the whole Bluetooth system. here, the

improvement of Bluetooth MAC layer scheduling algorithm for QoS is proposed.

In this paper [3], authors have carried out a study on varied Bluetooth wireless technologies. Their study includes operation of Bluetooth, Future Bluetooth hotspot technology, technology challenges. They conclude that Bluetooth is a wireless technology that can do far more than simply replace data cables between devices.

Here [4], the authors have done a literature survey on various aspects of Bluetooth related to versions, applications, features of scatter net and piconet and Bluetooth Protocol Stack and have discussed the fundamentals of communication, connection and pairing and bonding mechanisms. To make pairing possible between devices Bluetooth is a powerful technology using air interface. It allows us to exchange files, text, images, etc., over a network with a humongous range of about 60 meters. It can be used as a portable or fixed device. Also, for data transfer enhanced trustful security techniques have been built. Due to cost and competition from other standards, they have hindered the widespread acceptance, but Bluetooth does offer a viable solution to many devices that might not have wireless connectivity without it.

In this paper [5], novel features of Bluetooth LE and its applicability in 6LoWPAN networks are presented. They have identified and discussed the issues and challenges like: a secure and reliable multi-hop communication in Bluetooth LE-connected 6LoWPAN networks, How to secure the currently available broadcast communication and group communication in Bluetooth LE-connected 6LoWPAN networks.

The [6] paper gives an overview of the current state of Bluetooth and WLAN (Wi-fi) technology. The study covers a brief and precise introduction to the principles of this technology, major and current and envisaged fields of application, and also it addresses overview of the technologies in terms of services. The author has presented an overview of the two most popular wireless standards, with a comparison in terms of capacity, network topology, security, QoS support, and power consumption.

The [7] authors have analyzed the description of the technology in terms of its network infrastructure, hardware, and software, and also the Error corrections and retransmission. They have done a comparison of Bluetooth with other technologies. The authors have carried out an analysis of macro analytical view including the business implications, advantages of the technology, its role in the global third 3G wireless schemes. They have presented the applications and future potentials of Bluetooth.

4. PROPOSED SYSTEM

An application that can be used to address people where the mobile phones act as a microphone that broadcasts voice to the room when connected with Bluetooth speakers

which is portable and consumes less power as Bluetooth is energy efficient.

The main objective is to design an app that replaces hardware microphones and large speakers and to pair mobile with Bluetooth speakers which acts as a whole public addressing system and also to explore audio streaming interfaces and some protocols related to audio interfacing.

A. Methodology

The Data Flow diagram represented in Fig. 1. shows the flow of data from login to voice output, identified by following steps:

- If the user is already registered, then the user logs in through email and password.
- If the user is new, then the user registers using a name, email, password and phone number.
- Once the user logs in, the user turns on the Bluetooth button.
- The device searches for the Bluetooth speaker and pairs them with the Bluetooth speaker.
- Tap on the Turn on and give voice input.
- The output is heard through the paired Bluetooth speakers.

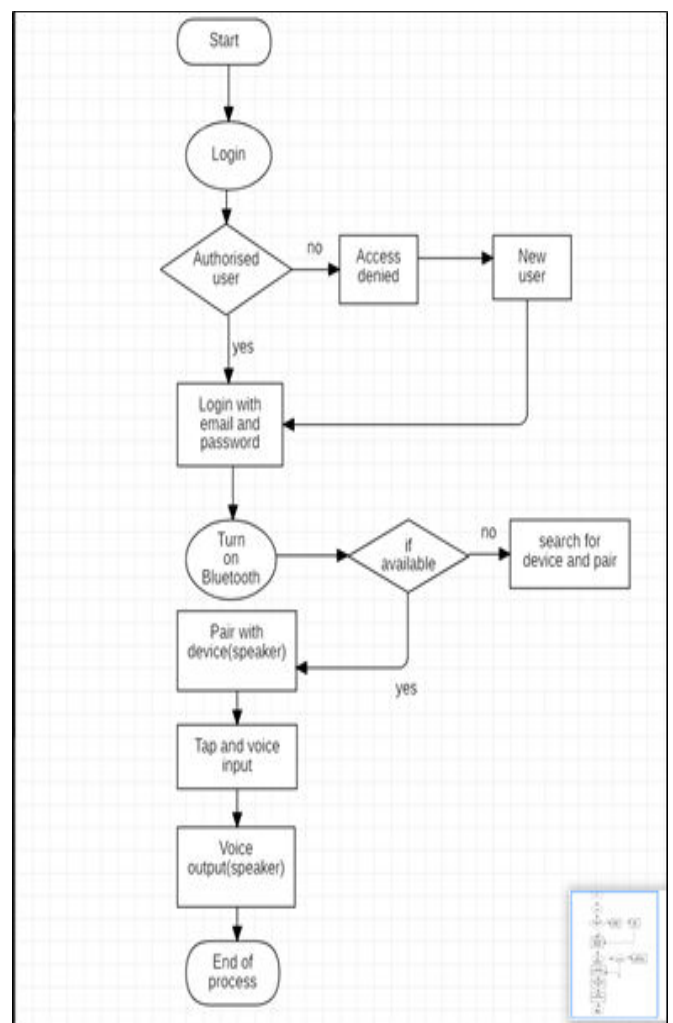


Fig. 1. Data Flow Diagram

B. Software and Hardware Requirements: -

For Android app development, the Android Studio is the official Integrated Development Environment (IDE). Also, IntelliJ has a well-developed code editor and developer tools that help the developer to code better. For the backend, Firebase Authentication is used, because it provides easily available SDKs and inbuilt UI libraries. The authentication in the firebase is supported using passwords, phone numbers, and popular federated identity providers like Google, Twitter, and many more.

The hardware required is Bluetooth Speaker to output the sound signals. Bluetooth enabled Mobile Phone to pair with a speaker which acts as a mic by taking voice signals as input.

C. Product perceptive: -

The system interface is the one that transforms the inputs into outputs. In our app, the input is voice through the built-in mic of mobile and the output is speakers. The app is very user-friendly and various features are self – explanatory. The speaker device must have in-built Bluetooth to connect with the mobile device.

The performance requirement of this application depends on how good the Bluetooth connection is, if the

connection between the devices is weak then it fails to perform well. To get better performance one must connect with a good Bluetooth connection device and should keep the devices within 10 meters of range as maximum space is 10 meters for two Bluetooth devices to be connected.

Logical database design helps us to define and communicate with the users' information requirements. In this application, we have normalized the table which contains email-id, password, and phone number of the users where the email-id is a unique key value/primary key.

5. IMPLEMENTATION AND RESULTS

A. Working: -

Initially, the user has to Log In using an Email Id and password if the user is already registered, else the user has to Sign Up using their Name, Email Id and password. Here the valid data entered gets stored in the Firebase and each time a user login the data is validated and it lets the user only if his credentials are valid.

Once the user Logs in successfully user will be directed to the page where the user has to Turn on Bluetooth and has to connect to the Bluetooth Speaker. In this Interface we can also perform other operations like Turn on, Turn Off, get a list of paired devices.

In the next interface, the user has to access microphone permission and the users have to turn on the mic to speak, where the voice acts as input and the sound signals

are transmitted into the speaker and are heard in the speaker as output.

In addition to these features, the app also supports karaoke singing i.e. an interface where a Music player has features like forward, backward etc. The user can download any karaoke song and play it on the music player and also simultaneously turn the mic on and can sing where both the audio inputs sync with each other and are heard in the speaker at the same time. The signal captured through the microphone is processed, mixed with the audio and played through the speakers.

The snapshot in Fig. 2. Shows that the microphone is in an inactive state, that is it is ready to receive audio signals, whatever the user speaks it is heard as output in the Bluetooth speaker which is paired with the mobile phone.

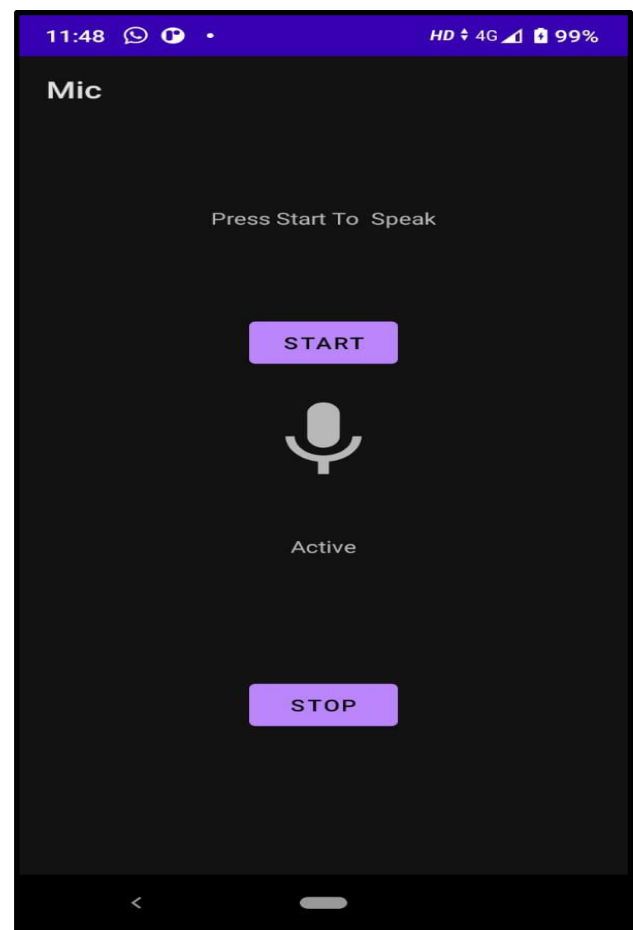


Fig. 2. Microphone in Active State

The snapshot shown in Fig.3. the inactive state of the microphone. When the microphone is in this state, the interface does not receive any signals and is not heard by the speaker.

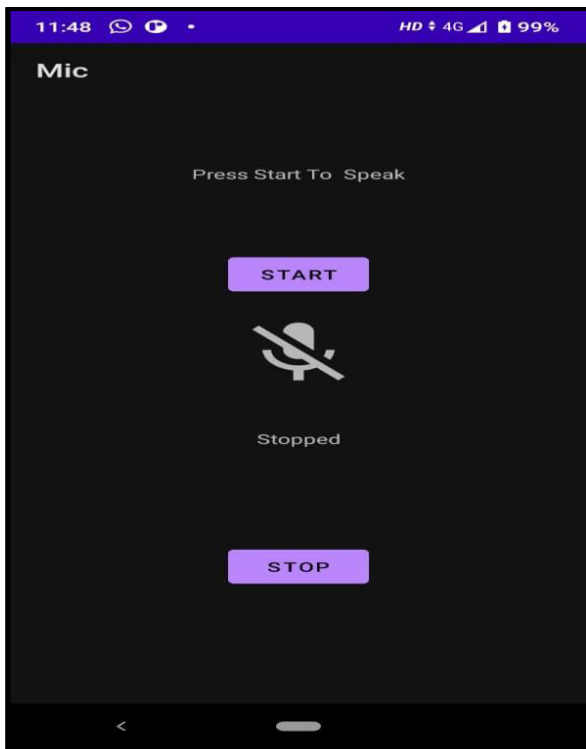


Fig 3: Microphone in Inactive State

6. APPLICATIONS

This App is used to transmit your voice from an Android phone to a Bluetooth speaker. That is, your Android device becomes a microphone and the Bluetooth speaker becomes a loudspeaker. This also works as a volume booster or megaphone at your convenience. We can use this app for the following applications:

- Sing karaoke at home or anywhere.
- Boost your voice when teaching in a classroom or lecture room.
- As speaker in Street plays and flash mobs and in conference room.
- Garage sale, outdoor sale, pop-up store sale, or other sales promotion.
- Mic for a tour guide at the hot spot.
- A fan of a sports team - sing loud to support your favorite sport team in the stadium.
- Parties, exhibitions, celebrations and many more cases.

7. CONCLUSION

At House parties or small get-togethers, we all need some music and talk to lighten up the mood, and thanks to our smartphones and speakers, things are taken care of quite easily. A portable mic app is an app to wirelessly connect your phone to a Bluetooth speaker. That is, your Android device becomes the microphone and the Bluetooth speaker becomes a remote loudspeaker.

8. FUTURE SCOPE

Additional features like Bluetooth Pairing with more than one device, Large distance coverage can be added to make the app more convenient and easier to use.

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