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# Voisee Communicator: An Android Mobile Application for Deaf-Mute and Blind Communications

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**ABSTRACT**

Voisee Communicator is an android type mobile messaging application designed and developed for the thorough communication between two disabled people most especially the deaf and blind people. With stable and smart Eclipse IDE and the availability of different built-in libraries in java especially the tts.speech.SpeechToText and tts.speech.RecognizerIntent has been taken advantage to create custom voice command functionalities.

Creating, replying, sending and forwarding messages are among the primary and fundamental features that this study has to offer. The researchers analyzed the results of the test survey and evaluation form and proved that the application is a user friendly, efficient and accurate in delivering messages to the recipient and has the important features that the users expected.

*Keywords:* deaf-mute and blind, communication; mobile application, Text-to-Speech, Sp

## INTRODUCTION

What is Communication? Communication can be defined as the process of transmitting information and common understanding from one person to another. Communication is an essential feature of humanity. It is the process of sharing our ideas, thoughts, concerns and feelings with other people and having those ideas, thoughts and feelings understood by the people whom we are talking with.

Communication—the ability to convey information to others and the ability to receive and interpret information from others—is fundamental to learning. Individuals learn about the world mostly through their senses of vision and hearing. Vision and hearing are the main sensory avenues for accessing and interacting with the world around us and for perceiving events as close or distant. When vision and hearing are reduced, even to a mild level, the losses affect the ability to communicate, develop personal relationships, and acquire concepts.

Globalization is one of the main words of the 21st century. We feel its presence in almost every field of our life: in economic, politics, culture and media. Accompanied by the rapid growth of information technology, android mobiles are now used widely in a variety of fields. Applications of mobile and various software in training, teaching, learning, and computer assisted instruction are a major future trend. However, most applications are designed for normal people, and are inaccessible to those who are deaf, blind, deaf-blind and people living with disabilities, unless extra adaptive tools and interfaces were designed for them.

Consequently, a current trend in high technology production is to develop adaptive tools for deaf and blind people to assist them with self-learning and personal development, and lead more independent

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lives. Traditionally, technology and other interventions designed for children with disabilities were focused on strategies aimed at correcting a child's specific impairment or deficit [9].

Assistive Technology was designed and made for everyone. Some assistive technologies that are used by the deaf/mute and blind are listed below:

1. *Braille:*

Braille is an exclusive medium, limiting a blind student's written communication with teachers and other students unless they too know braille. This kind of device is made for the blind and normal people communications.

2. *SmartTextSystem and PocketSMS:*

SmartTextSystem and PocketSMS are both an Android based mobile phone system that allows visually impaired and hearing impaired to send and read text messages from their phones using Morse code.

3. *Portable Communication Aid for Deaf-Blind People:*

It is a two-unit system designed for face-to-face and wireless communication between a deaf-blind person and a sighted partner. It is battery operated and portable. The blind will used Braille and normal will used a normal unit.

*2. Research Objectives*

*2.1. General Objective:*

The general objective of this study is to design and develop an android mobile messaging application that will serve as a communication aid between two disabled people.

*2.2. Specific Objectives:*

1. To design an android mobile messaging application that will serve as a communication aid between two disabled people.
2. To develop an android mobile messaging application that will help deaf, mute and blind people develop independent communication in their daily lives.
3. To evaluate the efficient of the android mobile messaging application by conducting an interview and formative type of evaluation.

**3. Materials and Methods**

*3.1 Designing of the Application*

*A. Analysis:*

The design structure of the application is based mainly on a text messaging over telecommunication networks. The data that will be fetched for operations and functions of the application is from the device storage.

*Architecture Design of the Proposed Application:*

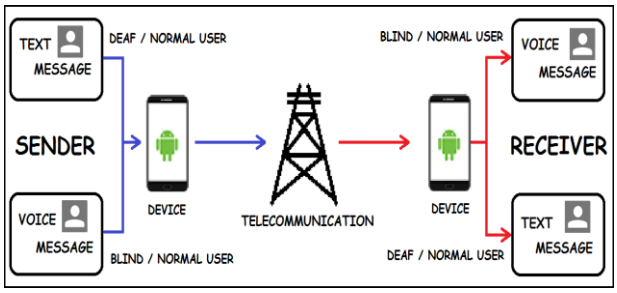


**Fig. 3.1:** Architectural Design of Voisee Communicator.

Figure 3.1 represents the architectural design of the Voisee Communicator. It is where the user will have to input a message into the device, and then the device having a prepaid SIM will send the inputted message to the telecommunication network. And in return, the telecommunication network will first check if the account is capable of sending the message, and if it does then it will forward the inputted message back to the device and the device will give the output message into the user. The application relies on the data storage of contacts and messages fetched from the device. The device which is used serves as the medium of communication between the sender and receiver.

*B. Context Overview:*

C. Figure 3.2 shows the context overview of the application. The diagram illustrates the general process of the users involve. In the sender phase, the deaf/normal user can create text message and send it either to blind/normal user through text message which will then be converted to voice message since the blind user is a voice oriented. On the other hand, voice-oriented user which is the blind user can also send a voice message that will be converted into text message to either to blind and/or disabled user through text message that will be converted to voice or to deaf/normal user through text message. This shows the interrelatedness of both the sender and receiver.

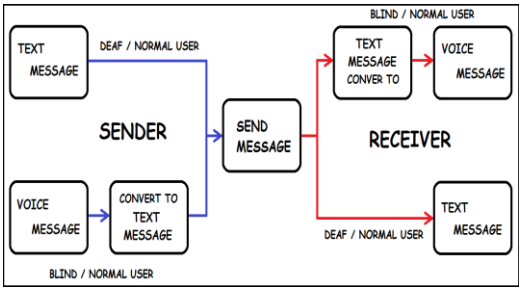


**Fig. 3.2:** Proposed Context Diagram of the Application.

*C. Detailed System Flow Design:*

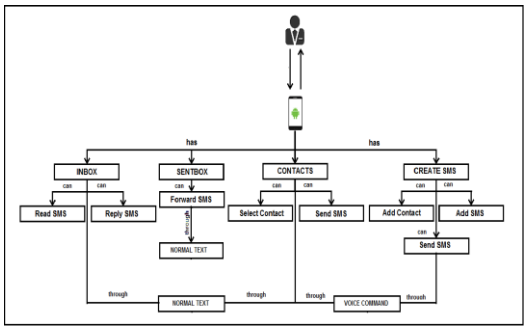


**Fig. 3.3:** Proposed System Flow Design of the Application.

Figure 3.3 shows the entire detailed system flow of the android mobile messaging application. The user that will have this type of application will be in need of an android device with a SIM that has a load balance.

In the user's device, the application has a messaging dashboard where inbox, sentbox, contacts and create message are involved. In the inbox section, the application can read and reply SMS, as well as in the Contacts section wherein it can select contact and create message. In the create message section it can add contact, add and send a message while the sentbox section can only forward a message for the deaf/mute users.

*D. Messaging Architecture Design of the Proposed Application:*

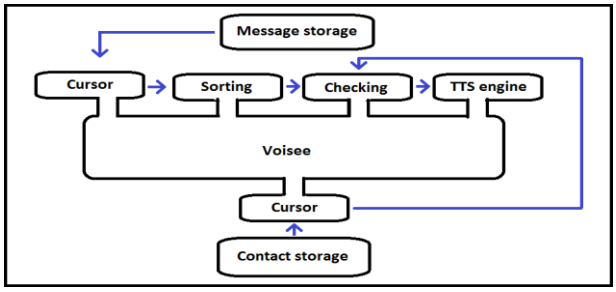


**Fig. 3.4:** Messaging Architecture of Voisee Communicator.

Figure 3.4 shows the architectural processes of the proposed messaging application. This figure illustrates on how Voisee Communicator application processes the processing in outputting the desired data. The message is fetched using cursor from the default inbox, sort messages from newest to oldest messages received, fetched the address (receiver's contact number) to the default contact list of the device and check if the address exists or not. If the address exists then the application will read the address and if doesn't, the application will give a keyword to the unsaved address received.

*3.2 Development of the Application:*

*A. Software Specifications:*

*1. Eclipse IDE:*

Eclipse IDE is one of the most important software tools when it comes to developing an android application. With the development of Voisee Communicator, the researchers will use the Eclipse

IDE because of its great capability to handle errors.

*2. Text-To-Speech (TTS) and Speech-To-Text (STT) Engine:*

With a built-in text-to-speech and speech-to-text engine, Voisee Communicator will possibly be implemented since it's an engine that converts normal language text into speech and vice versa.

*B. Hardware Specifications:*

*1. Android Smart Phone:*

Smart phones have its own classification based on its brand and features. With this study, the application will be based with a phone that has an android OS with a 4.4 (KitKat) version and with a built-in text-to-speech and speech-to-text engine.

*2. SIM Card:*

Mobile phone needs a Prepaid Subscriber Identity Module (SIM) that will be used and serves as a portable memory chip for the operation on the Global System for Mobile Communication (GSM) network. SIM is important when about for testing and continuing development of the Voisee Communicator because it does hold the personal information of the account holder, including his or her phone number, address book, text messages, and other data. Addition to this, prepaid SIMs will be any of networks available depending on the subscriber as long as it has load balance of his SIM card account.

*3. Earphones:*

Android Phones need earphones to receive radio or telephone communication and/or to listen to a message. With this device, Voisee Communicator will be able to receive accurate commands and information without being interfered by other noises in the surrounding of the user.

*C. Libraries:*

1. Voisee Communicator incorporates the Main Libraries for Converting Texts and Recognizing Commands

```
import android.speech.tts.TextToSpeech;
import android.speech.RecognizerIntent;
```

**Fig. 3.5:** Screenshot of the Built-in Libraries.

Figure 3.5 shows the main imported libraries used in Voisee Communicator development. Main libraries are imported in order to perform such necessary actions like fetching, responding, and converting. The speech.tts.TextToSpeech library executes the converting of Speech into Text and Text into Speech. Also, speech.RecognizerIntent library involves the fetching of speech and responding to the speech given.

*2. User Interface of the Application:*

In the first phase of the first setting of the user interface of the application, Voisee Communicator's activation will be of synchronous text display and voice command sounding.

With different commands instructed to the user, the application will then recognize which user is using the said application. The voice command is designed for the blind while normal text display is for the deaf and mute. The blind will just tap once for Voisee Communicator's recognition and the rest of the tapping actions will be of manner for the deaf/mute.

Moreover, in the user interface design communication process relies on the speaker sounding and normal messaging.

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*Authors' Contribution:*

Mr. Landicho and Mr. Benantolis generate the idea and concept of the research. Mr. Cabason and Benantolis developed the mobile application. Mr. Ramos and Ms. Sonquipal test and evaluate the application.

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