Telecommunication Software for the Hearing-Impaired

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ABSTRACT

This paper will introduce the telecommunication software that was developed for the hearing-impaired. The background and motive for developing this software will be presented, together with the main features of the program. The paper will then discuss the reasons for having such features, and the feedback from users with regards to these features. Current problems with the software are also raised and some possible improvements are given.

INTRODUCTION

Over the years, the hearing-impaired community in Singapore has been largely cut-off from the hearing world with regards to telecommunication. Only in recent times, as the Short Messaging System (SMS) and Instant Messaging (IM) technology (like MSN and ICQ) became available, could the hearing-impaired have conversations with each other through the telecommunication system. These however, have disadvantages like delayed messages (SMS), or the need for both parties to be online at the same time (IM).

A less affordable alternative would be to use a Teletypewriter (TTY), which can be connected to a normal telephone line and used like a telephone. The hearing-impaired all over the world use TTYs, but due to the small hearing-impaired community in Singapore, these devices are costly and are a rarity.

The aim of this project is to build a system where communication between two hearing-impaired individuals can be carried out over a regular telephone line. Communication will be text-based and accomplished through connections to PCs on either end of the phone line.

The software program will function like a normal telephone (unlike IM systems where communication is done through an internet server). Callers will be able to dial a number using the program and the program (at the other end of the phone line) will alert the receiver by visual means. Two-way text conversation can then be carried out over the telephone line.

METHODS AND FEATURES

The approach taken in building the software is the use of modem as communication interface. This is different from the TTY, which uses an existing telephone as the interface. This software is more akin to programs used for Bulletin Board Systems (BBS) and Internet browsing. The main advantage of this approach is eliminating the need to create a communication protocol (TTY uses the Baudot 5 bit protocol). All that is required is the writing of data to the modem, and the modem will handle the data transfer.
A second advantage of using modems is that most people would already be using modems for Internet connection. The hearing-impaired who use IM programs for chatting would likely also be using modems. With the software, instead of dialing their Internet service provider’s server before using IM programs to chat, they can dial each other directly.

The main challenge is the designing of the user interface. Most people familiar with IM programs would relish the “real-time-ness” in seeing the other party’s words displayed on the screen. This is implemented in the software with two separate boxes, one for the words you typed, and the other for the other party’s words (see Figure 1). This means both party can type at the same time without the information becoming garbled (TTY allows only one party to type at a time, so users need to learn codes like “GA” meaning “Go Ahead” and signals that it’s their turn to type.)

![Figure 1: Screenshot showing the program in use. The white box shows where the user types, while the grey box shows what the other party types. At the bottom are the user-friendly buttons.](image)

The user interface is also made to be simple-to-use with easily understood button labels like “Pick up phone”, “Dial” and “Hang up” (see Figure 1). This is because there are still many hearing-impaired who are not technologically inclined. The buttons also does away with the need to know the Hayes modem commands (BBS programs required users to type such commands to do dialing and hanging up.)

User-friendly messages are used to show the different stages that the program is in (see Figures 2a and 2b next page). This is very important since visual cues are the primary means that the hearing-impaired interact with the world.
Figures 2a & 2b: Message boxes that show the different stages that the program is in.

In addition, users are given the option of saving the conversation for records. The whole conversation is saved into a text file in the same form that it was typed in the conversation boxes. (Figure 3)

Figure 3: The saved conversation, shown in a text editor (Notepad)

RESULTS AND DISCUSSION

The software has been largely well received by some of my hearing-impaired friends at Asian Deaf Association (Singapore) who helped with testing. The real litmus test will only come when more people use it. In the mean time, the software still needs much getting-used-to, especially by users who are already familiar with their IM programs and SMS.

Due to the heavy reliance on modem, this telecommunication program is also limited by it. In particular, since many hearing-impaired also use fax machines for communication, and fax machines use the same modem protocol, the program cannot run properly with an enabled fax machine using the same telephone line. It was found that the fax machine tends to intercept the communication, especially when the caller and receiver modems are trying to establish communication. This problem has yet to be resolved and may require additional hardware (like a router) to solve. It is hoped that the widespread use of the program can make the fax machine obsolete in text communication between the hearing-impaired. Until then, it will have to become a routine to disable the fax machine before using the program.

The other inherent problem of the program is the need for both parties to have the program in order to communicate. If the receiving end uses a normal telephone to answer the call, the screeching sounds of the caller’s modem will be heard. This is true even for TTYs, and is solved if a Telecommunications Relay Service (TRS) was in place. Currently, Singapore does not have the infrastructure for TRS to be established and it is hoped that this would come with time.
Another problem that was pointed out is the long wait when the caller and receiver modems are establishing connection. The wait is made longer if the other party does not pick up the phone fast enough. Unfortunately, this problem occurs when modems are used as communication interface. Modems have to establish the communication speed and protocol during connection. This takes some time and is unavoidable.

CONCLUSION

The telecommunication program Telechat Version 1.0 has been developed for the hearing-impaired community to make text-based telecommunications. This program uses the modem as communication interface. It has a user-friendly graphical user interface, very much like Instant Messaging programs. It allows both parties to type at the same time without information becoming garbled. It also has easily understood buttons that hide the dialing and hanging up processes. Users are also able to save the conversation into a text file for records.

Telechat Version 1.0 still has limitations inherited from the use of modem. This includes the interception of communication between two modems (caller and receiver) by an enabled fax machine connected on the same line. This problem may require additional hardware in order to solve.

Despite the problems, Telechat is still well received by my hearing-impaired friends who tried it. More teething problems are expected to surface as the number of users increases. It is hoped that future versions of the program will be able to fix these problems. Further additional features (like fonts, graphics etc.) may also be added such that it approaches the feature-rich Instant Messaging programs.

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REFERENCES