Gong - a Voice for the Web World

Rossiter, David [1] and Lam, Gibson [2]

1 rossiter@ust.hk
2 csgibson@ust.hk
Department of Computer Science and Engineering
The Hong Kong University of Science and Technology

ABSTRACT

This paper provides an overview of the Gong project, a system we have developed for web-based audio communication which is freely available for download over the Internet. We first consider our intention in developing the product and the basic features it offers as a hierarchically structured voice board. We then look at more advanced features including audio playback speed control, the use of speech recognition techniques for automatic word indexing, and integration with other Learning Management Systems, particularly the open source Moodle system. Finally, we consider how popular the system has been at UST, where it has been used by thousands of students, and around the world, where it is used by many universities for teaching a range of different languages.

Keywords

Gong, voice, moodle, Java, Learning Management System

INTRODUCTION

The Gong system was developed to facilitate web based audio communication. It has been used at the authors' home institution for several years, primarily for language courses. A paper in this Symposium three years ago [1] described a very early version of the software. Since then a great deal of development has taken place. This paper provides an overview of the features of the Gong system and considers the interest shown in the project around the world after the software was released free and unrestricted on the web at **http://gong.ust.hk** in June 2006.

BASIC USE OF GONG

The system was originally conceived so teachers and students would have a central place to meet and converse on the web. Through it, voice and text recordings can be made and posted to a voice board. People can read the messages, reply and post new recordings as appropriate. In this way Gong can be used as a complement to face-to-face teaching, or, potentially, as a replacement. Figure 1 shows a Gong voice board for a language course.

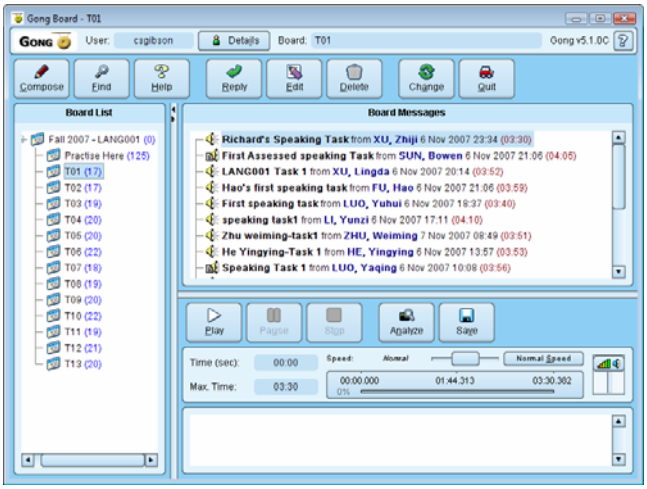

Figure 1. A Gong voice board for a language course.

There are two ways in which Gong can be used. The first is as an applet, meaning that Gong is loaded and used inside a browser. The second is as a stand-alone program. The Gong program and Gong applet look and behave the same, and can be used interchangeably. The choice of which to use depends on the learning context. For example, if Gong is being used inside another web based Learning Management System (LMS) then the Gong applet will be used. However, if Gong is being used outside the context of any other system then the Gong program may be employed.

ADVANCED FEATURES OF GONG

A number of advanced features have been developed, as follows.

- **Playback speed control.** We added the ability to speed up or slow down the audio playback speed, without changing the quality or pitch of the sound. This is particularly useful for language learners where a slower speed of speech gives more time for the listener to understand and appreciate the content.

- **Audio indexing.** Using speech recognition techniques we developed the ability to automatically index an audio recording. For this feature the text portion of the message needs to be a transcript of the audio portion of the same message. After the indexing process is complete any word or words in the message can be selected, and they will then be heard spoken in context. The speech comes from the original recording and not from any speech synthesis. Furthermore, a measure of the absolute speed of the voice recording is calculated and displayed. This measure is the number of words spoken per minute. It is displayed and dynamically updated according to the current playback speed. This is illustrated in figure 2.

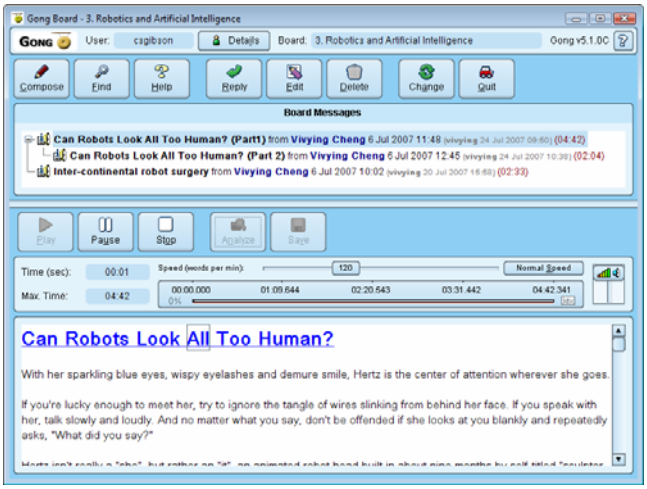

Figure 2. An example of an indexed message being played at a slower speed than normal.

See [2] for more discussion about this feature.

- **Recordable chat.** Through the use of Gong two or more people may speak and type text together in real-time. The chat session can be recorded, if desired. Individual contributions can subsequently be accessed separately, and appropriate feedback given. The Gong chat interface is shown in figure 3.

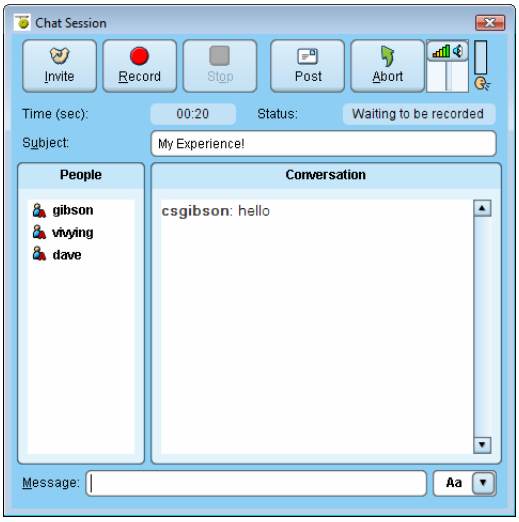

Figure 3. An example of a Gong chat session in progress (shown in the upper part), with the corresponding display in the voice board after the chat session has been completed (shown in the lower part).

- **Pinyin and Yale input.** Gong has unique features to assist with learning Chinese. In particular, there is comprehensive support for the PinYin system for learning Mandarin Chinese, and the Yale system for learning Cantonese. This is illustrated in figure 4.

Figure 4. The PinYin input interface.

Users of Gong can choose to enter the basic Chinese word by typing the appropriate letters and then applying the pitch information to the word by selecting the appropriate button in the GUI, or by using shortcut keys on the keyboard. Please refer to [3] for further discussion.

- **Multiple language interface.** The Gong interface can operate completely in American English, British English, Traditional Chinese, Simplified Chinese, or Japanese. Three examples are shown in figure 5.

Figure 5. Examples of the Gong interface in (a) English
(b) Traditional Chinese, and (c) Japanese.

- **An audio editor.** A powerful audio editor was developed so any voice recording could be edited before or after being posted. For example, periods of unnecessary silence, noise or hesitant speech can easily be removed.

INTEGRATION INTO OTHER SYSTEMS

Use of Gong as a module for other LMS

We designed the Gong system so it could be easily integrated with any other Learning Management System (LMS) system. To achieve this a 'middle stage' between the Gong system and the LMS needs to be included so communication can take place. We developed one such middle stage for the most popular learning management system, Moodle. In Moodle terminology this middle stage is called a 'tool'. After installing the tool in their Moodle system users can experience Gong as if it is part of the Moodle system. For example, only one logon is required, and any communication between the two systems is automatically and 'invisibly' handled.

Use of Gong through an API

The comprehensive set of audio operations supported by Gong may not all be needed for a particular learning context. For example, perhaps an instructor simply wishes to add a few sound recordings as examples in a course web page. Another issue is that the visual size of the complete Gong applet may be too large.

To address these issues and others we developed the Gong Application Programming Interface (API) so programmers can access the Gong system's features by writing their own code. Using this method a programmer can write code in a web page which completely controls the Gong applet. The Gong applet itself can be optionally hidden, providing the programmer with the opportunity to present a different visual interface to the Gong functions. For example, the programmer may develop a new GUI inside the web page to control the Gong functions being used. Please refer to figure 6 for an example.

Figure 6. An example of a web page in which the Gong GUI has been replaced by one of the programmer's own creation.

The user would then interact by clicking on the various elements of the new GUI. This triggers relevant code, which then instructs the Gong applet. For example, the Gong applet can be instructed to play any sound recording in the Gong system at a specific speed, or to make a new voice recording.

For more discussion on these issues, please refer to [4].

PODCASTING

The original concept of podcasting was that audio recordings are downloaded from the Internet to a portable device so they can be listened to while traveling to school or work. We developed Gong so any voice board may simultaneously operate as a podcast. The audio messages in the board can then be accessed by any device or program capable of understanding podcasting. After downloading the Gong podcast the user can listen to the recordings at his/her own time and convenience. At the time of writing this feature has been deployed in our home institution, but not in the public release of Gong. Please see [5] for further discussion of this feature.

INTEREST IN AND DOWNLOADS OF THE GONG SYSTEM

We released Gong as a free, unrestricted system in June 2006. Prior to downloading it people are required to enter some basic information, such as their name, institution, and the number of people they estimate will use Gong. At the time of writing there have been more than 1000 genuine downloads.

NANOGONG

From feedback by users we realised that a number of people were not able to install their own complete copy, either because they were not technically proficient in installing computer systems or because they did not have an appropriate computer permanently connected to the Internet. For such situations we designed an alternative to Gong, called NanoGong. The appearance of the NanoGong applet is shown in figure 7.

Figure 7. The visual appearance of the NanoGong applet.

NanoGong is a visually simple applet which does not require any kind of special installation or server access. It lets users add the ability to record and playback their voice to any web page. The voice can be slowed down or speeded up during playback using a simple slider. The recording can be saved in a soundfile, and the soundfile placed on any web page for easy playback.

After initial trials in the Language Center we made NanoGong freely available on our web site in June 2007. Since then there have been more than 120 genuine downloads from a variety of educators and institutions around the world.

ACKNOWLEDGEMENTS

The Gong project has been supported by several Continuous Learning and Improvement (CLI) grants, as well as a grant from the Office of Vice President for Academic Affairs (VPAAO) of the Hong Kong University of Science and Technology. CLI grants are funded by a Teaching Development Grant obtained by the Center for Enhanced Learning and Teaching (CELT) of the University, and subsequently by the VPAAO.

REFERENCES

1. David Rossiter and Gibson Lam. The Gong System. *Proceedings of the Hong Kong University of Science and Technology Teaching and Learning Symposium 2004*, pp 87-91

2. David Rossiter, Gibson Lam and Brian Mak. Automatic Audio Indexing and Audio Playback Speed Control as Tools for Language Learning. The 5th International Conference on Web-based Learning, 19th July - 21st July 2006, Penang, Malaysia, Lecture Notes in *Computer Science* vol. 4181, Springer-Verlag, 2006, pp. 290-299

3. David Rossiter, Gibson Lam and Vivying Cheng. The Gong System: Web-based Learning for Multiple Languages, with Special Support for the Yale Representation of Cantonese. The 4th International Conference on Web-based Learning, 31st July - 3rd August 2005, Hong Kong SAR, China, Lecture Notes in *Computer Science* vol. 3583, Springer-Verlag, 2005, pp. 209-220

4. Gibson Lam, David Rossiter and Roger Cheung. Web Content Development and Integration Using the Gong System. The 4th AEARU Workshop on Network Education, 16th November - 17th November 2006, Taipei, Taiwan, pp. 125-138

5. David Rossiter and Gibson Lam. Integrated Learning with Podcasting Import and Export in the Gong System. International Conference on ICT in Teaching and Learning 2007, 9th July - 10th July 2007, Hong Kong, pp. 27-36