

Change the Human Voice into the Character Giggle - Prerecord and Realtime Process

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Abstract - The purpose of this paper is to explore the possible way to modulate the human voice into the voice the scenario of Dancing the Earth project may need. Instead of using the voice actor, this paper tends to find out ways that turn the museum's volunteers and the retirees, who participates in this performance, to turn their voices into the characters' voices, which are the virtual docents and the virtual characters.

I. INTRODUCTION

In Dancing the Earth, based on different scenarios, there will be a lot of virtual characters on the screen, which might be a human character or a talking animal. All of those characters need to have the "voice" which match to their personality or roles. For instance, if the human character plays the role as a professor, then he/ she needs to not just looks like a professor but sounds like one; if the virtual character is a talking father bird, then he needs to sound like a father and also a bird, which needed to be well design to

convince the audiences that he is really a bird talking.

Since there will be no professional voice actors but only museum volunteers participate in to construct or pre-record the scripts, and perform real-time on-site when the program runs, there are needs upon the voice changing technic and the software support on both sides of pre-record and real-time procedure.

II. THE PROBLEM

Most of the sound modulating softwares, normally called voice changer or pitch shifter, are lacking out of the flexibility when producing a unique designed sound. Those presets and limited parameters are not qualified for what this project required, especially when working on a non-humans character' voice.

On the other hand, to identify which part in the scenario could be pre-recorded and which part has to be real-time processed is also importance for simplify the work. This also related to the design of the on-site audio and video setting at the exhibition control space.

The sound modulation and the pre and realtime record plan are the two main issues discussed in this paper.

III. PROPOSED SOLUTION

There are already many voice changing softwares and also freeware on both PC and Mac system. For instance, Auto-Tune. As mentioned before, lacking out of the flexibility of producing unique designed sounds is the biggest problem of these existed softwares. In order to crash the trap of these software limitations, to break down the preset software into the simple effectors is one way to solve the problem.

In theory, the sound is constructed by timbre, pitch, and loudness, in the scientific way of speaking, they are turning into the waveform, frequency, and amplitude (see Figure 1 to 3 below). Waveform is why we could identify one person or instrument from another, frequency is the pitch, and the amplitude is how loud the sound is, which means if the user could control the waveform and the frequency, then they could ideally change the sound into whatever sound they want. The voice changer and sound shifter are basically the products which applied these knowledges, give some of the adjustable parameters which related to the waveform change, frequency change, and design their own user interfaces.

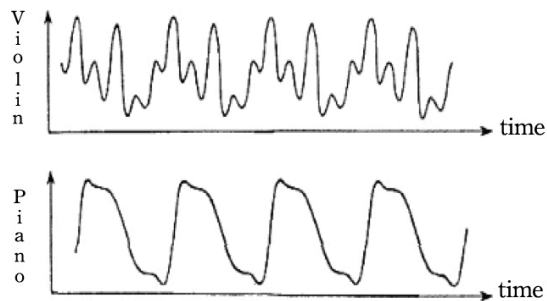


Figure 1. Timbre(waveform)

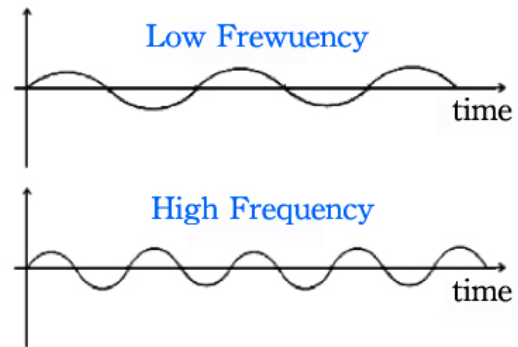


Figure 2. Pitch(frequency)

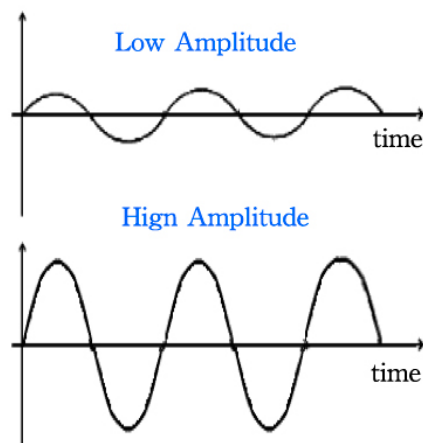
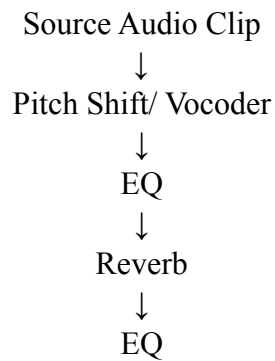


Figure 3. Loudness(amplitude)

There are many audio editing and production software, such as Pro Tools[4], SoundTrack Pro, Avid, Nuendo, and Adobe Audition, etc. on the market. Also, there are some standard sound effectors which related to the frequency, for example, EQs(Equalization) and filters. Both of these standard sound effectors are conveyed in almost all the audio editing and production software. Other popular effectors which associated with the frequency and the waveform adjustment are vocoder, pitch shift, reverb, chorus, and time shift, etc..

In order to modulate the voices, there is one thing needs to be set before-hand: the order of the sound effectors. When deal with the

prerecord part, here is the simplest example of the workable order of the effectors in audio post production.



For the real-time voice changing, the specific software has to be built. Based on the scenarios, there could be presets setting in the software and leave enough flexibility for the further adjustments in order to fix the specific character.

In the performance, there will be one virtual docent and maybe several other virtual characters, and a on-site staff, together, hosting the audience. The on-site staff will interact with the virtual docent at some points in order to convinced the audience that the virtual docent is a “true” character not just a pre-record animation; the virtual docent will welcome the audience and introduce the story and environment, there also will be a teaching section which guides the participants how to interact and play in the story.

One of the reason to propose to pre-record some parts of virtual characters’ acting and dialogs is to concern about the complex of the audio setting at both volunteer side and the on-site audio control. The other reason is because the volunteer who behinds the scene will need to switch the sound when acts in different virtual characters, control the avatars, follows up the scenarios, and also the crowd control. There are so many operations at the

same time that the volunteer has to take care of. To pre-record some of the parts will ease the level of controlling this project system and help to smoothen the work. This idea could also apply to the video design.

For the interacting part, such as talk to the audience or to the staff, consider about the realistic of the interactions and the real-time responds, it will be impossible to put these parts in pre-record. Neither the teaching section. Even if the teaching section will be always the same, the on-site respond from the audience and the reaction of the audience will never be the same. The conversation between the virtual docent and the audience might also help to forward the interests of the audience and increase the opportunity to share about the educational concept.

On the other hand, for the welcome and the introduction parts, the virtual docent could always use the same script and talk in the same way, also regardless of what and how audience responds. The other characters, which other than the virtual docent who always need to lead or responds, if they only do the follow up actions, no any real-time interaction with the other characters or the audience, then, their actions could also be pre-recorded. These will be the parts and situations that could be pre-recorded and pre-edited. The pre-recorded audio clips could link with the video clip or set as a button or a file, which will play the whole clip within only one command or click, on the volunteer control interface and play while the volunteer commands. Because the participants will have two sensor sticks or Wii control on their hands, the pre-recorded clips might also be trigger by the sensor when any sticks get close to the specific area.

IV. CONCLUSION

This paper is to conclude and to feedback to the Dancing the Earth project after the overall discussion in the Applied Interactive Story at Fall, 2009. It mainly focus on the voice change technic and process, together with the discussion of which part of the scenario could be pre-recorded and which part will need to do at real-time. And also mention a little bit about the difficulty of volunteer to do the real-time and multi-function controls and the control interface design.

The dialogs in this interacting performance play the leading role of the whole show that makes the voices of the characters so important. The voice is not just for identify the character but give the characteristic to it and also help the audience to be more involved in the performance.

Through broken down the voice changing method and technology, we are now be able to build our characters' voices, in terms of each scenario, with the large scale of flexibility and apply the imaginations and creativity when design the characters' voices. For a period of time, these settings could be combined and becomes a voice changing database which could apply to the further projects.

For the real-time voice changing software, based on the methodology shown in the previous section, will still need the software engineer to help building the real-time processing software designed specifically for this project used. The technical issue of building the software and also the control interface hardware and software design will be two of the issues have to discuss in further discussion.

After the final scenario comes out, in terms of the possibility of interaction in each section, there will be pre-recorded clips in

audio and video, real-time audio processing, and real-time control video clips. The section which will be no interacting point or the possible interactions could be ignored, will be pre-recorded and pre-edited. No matter the pre-record clips are audio only or together with the video clips, each part will be set as an one step controlled, which means they will play the whole clip when the volunteer press the button with only one command or one clip.

The interactive performance still has huge potential on the education, the art field, and others. To be the pioneer of this kind of performance is absolutely challenging. People most likely to learn better when doing, after the basic model been set and through the multiple tests, the interactive performance is definitely one of the most efficient type of performance to educate people the multiple concepts, not only the ecology.

APPENDIX

- [1] Adobe: Audition. Official website: <http://www.adobe.com/products/audition/?promoid=DINSG>
- [2] Antares: Auto-Tune. Official website: <http://www.antarestech.com/products/auto-tune-evo.shtml>
- [3] Apple: Final Cut Studio -- SoundTrack Pro. Official website: <http://www.apple.com/finalcutstudio/>
- [4] DigiDesign: Avid and Pro Tools. Official website: <http://www.digidesign.com/>
- [5] Steinberg: Nuendo. Official website: http://www.steinberg.net/en/products/audiopostproduction_product/nuendo4.html