I Am Trying To Make Sense
Signal Processing as a Paradigm for Composing

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Abstract

One of the many advantages technology has provided in the arts is the ability to recontextualize natural (i.e. not synthesized or rendered) sounds and images according to the design of the composer/artist. While electronic composition is seen by many as a way for composers to detach themselves from sonic concerns and limitations associated with acoustic phenomena (the synthesis approach), the ability to use signal processing as a tool for soundscaping of perceptually known sounds is a paradigm which gives a composer incredible flexibility in terms of motivic organization, both of traditional compositional notions (rhythm, melody, harmony) and semiotic indicators. This essay presents an informal description of the author's personal approach to signal processing as a valid tool for music composition.

作曲のための実例としての信号処理技術の意味

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　　芸術分野で用いられる有意義な技術のひとつは、作曲家/芸術家のデザインに従って自然な(合成やレンダリングしていない)音や画像を再構築する能力であろう。電子音楽作曲は、音波への考慮、そして音響現象に伴う限界から離れる為の作曲家のための手段(音合成へのアプローチ)と多くの人に考えられている一方、知覚的に知られている音の音風景を描くツールとして信号処理を扱う能力は、伝統的な作曲概念(リズム、メロディ、ハーモニー)や記号学の標識の2つの動機構成において作曲家に驚くべき柔軟性を与える模範となっている。この論文で、音楽作曲への効果的なツールとしての信号処理への著者の個人的なアプローチを非公式の記述として提示する。

Introduction

I've been listening to a lot of talk radio lately. There is something a little disturbing about the fact that disc jockeys, and by extrapolation the radio public, can listen to the largely anonymous mass of people who call in to talk radio stations and, without knowing anything about them, immediately discern from just a few words a wealth of information about them. We make educated guesses about their regional origin, their level of academic schooling, their marital status, whether they are calling in because of political concerns, moral concerns, boredom, or just plain loneliness. We even find ourselves making assumptions about their physical appearance. All because we hear their voices coming over the receiver: dynamically compressed, spoken directly into the handset of a telephone, without a clue to whether these people are sitting in their living room, their bedroom, their church, their car, or standing in the pouring rain at a payphone. I often feel like an intruder when I listen, as if I've been eavesdropping on a good friend meeting with her/his psychiatrist.

Rewriting Memory

One of the more ridiculous things that I do in my spare moments is listen to old answering machine messages that I've saved over the years. When I listen to these tapes, I try very hard to remember what I was thinking when I first heard the message when it was left on my machine. The first computer music piece I ever wrote was designed exclusively as a study on the sorts of things you can do to a single answering machine message to create a soundscape that frames the message, setting a musical mood to the message that reflects the mood I had when I first listened to it. I realized that I couldn't remember what time of day it was, or what I was doing when I first heard it, but I could remember exactly how I felt, and I tried to project those feelings on the person's voice through signal processing.

I always compose in reverse: I take a perceptually coherent sound and then replicate it a dozen or more times, rendering it more and more abstract and incoherent each time as I filter, spatialize, granulate, transpose, stretch, reverse, and rearrange it. Then I reassemble the sounds into an organized composition where the original sound becomes gradually more present as the piece progresses. I put a certain amount of faith in the immense human facility to comprehend a sound long after it has been artificially processed, and I trust that the gradual unfolding recognition process that goes on in those pieces provides sufficient formal structure to make the music consistent and enjoyable. If I were to realize a phased tape piece like Steve Reich's Come Out, I would do the entire thing backwards, bringing the tape decks gradually into phase as the motive of the piece repeats endlessly.

Blind Films: Foley as Art

As any good student of post-Eisenstein cinematography knows, the disembodied voice, especially the disembodied female voice, has a million semiotic references that have surprisingly little to do with the actual dialogue spoken but a lot to do with how the voice is presented spatially. There is a great deal of difference between the voice of a woman offstage, presented as part of the diagetic sound, and the voice of a woman speaking close to the microphone, right in the middle of the speakers, louder that the rest of the movie's sound.

Computer music is a wonderful medium for creating soundtracks for films that have no picture. While visual signal processing in the form of special effects is standard fare for Holywood films,

more attention should be paid (on the part of the listener and the screenwriter) to how the sound is treated. My grandmother is an excellent teller of stories, and I once tape recorded her speaking for four hours as she reminisced about her life. The recordings were then edited to give little clue to the surrounding acoustic scene: an appalling amount of background noise reveals nothing about the soundscape in which she originally spoke, only that I used a substandard recording device. As a result, my compositions using her voice are free to recontextualize her stories in any way I like. The manner in which I chose to present her stories was from her own ears, as I simulated my artistic impression of her tinittus with contralto vocal melodies, comb-filtered to sound like ringing. My voice was eliminated from the recordings, giving the piece the feeling of a one-sided conversation. The resultant musical structure gives the piece the form of a simple and somewhat disturbing narrative, much like a film noir voice-over. Only the film never gets to the action; instead, the words define the event.

Invented Dramas

Talk radio again. A man is talking about politics. His is ignoring the disc jockey's lame attempts to interject. As a result, a recording of the radio program with the DJ's voice removed differs little prosodically from a political tirade at a party rally. Using just the man's voice, I could turn a simple, dry, radio dialogue into an invective delivered in front of thousands of people. The appropriateness or inappropriateness of this approach to composition is made even more relevant by the fact that, with computers, not only can I recontextualize this manàs voice, but I can distribute the recording over the internet. His speech is no longer a sign without a clear referent. This man is clearly distributing his opinions as propaganda, and could be investigated as a political subversive. Who is responsible? The man on the radio? The disc jockey? Me? The person who wrote the reverb algorithm that I used?

Conclusion

The development of recordable sound media and playback systems has been to many people the crucial watershed in twentieth century music. Children today are far more likely to have a stereo in their home than a piano. The resultant long-term effect is that people take for granted sounds that, fifty years ago, they would never have heard without direct personal experience of the environment in which those sounds occur. I can inexplicably recall, even as a child, the sounds of war, even though I have never seen a gun fired at close range or heard a bomb explode. In many ways, this can result in a certain perceptual cynicism which comes from the idea that we can hear destruction from the safety of our living rooms. When I write music, I craft my soundscapes to convey my personal impressions of a sound which I have directly experienced. Like any other artist who has wrestled with the cacophony of real life, I am just trying to make some sense of it all.