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Aesthetics of Multimedia and Visual Concepts in Electroacoustic Music

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Abstract

This paper proposes that concepts derived from multimedia and the visual domain can be applied to a compositional approach to electroacoustic music. In particular compositing, spatial montage and space-medium as defined by Lev Manovich can be applied to form. And, vectors as defined by Herbert Zetl can be applied to create various relationships between sounds. This approach to composition is further supported by shared perceptual phenomena between sound and image such as figure-ground organization. This paper also discusses comparisons between sound and visual objects including the idea of sound edges.

Introduction

When Pierre Schaeffer released his *Treaty of Musical Objects* in 1966, his idea of reduced listening placed emphasis on the sound object considered only for its inherent qualities. Since then, Denis Smalley has introduced new ideas to electroacoustic music that can be related to the visual domain: “spectromorphology is concerned with motion and growth processes, which are not exclusively or even primarily sonic phenomena: sonic motion can suggest real or imagined motions of shapes in free space. Spatial experience itself can involve sounds or not. Energy, which is inherent in spatial motion, is part of both sounding and non-sounding experience” (Smalley, 1997: 110). Smalley’s ideas have opened doors for composers to explore the visual domain further for compositional and analytical approaches. This paper discusses the use of concepts related to structuring visual images in multimedia, and how these concepts can be applied to composition and analysis of electroacoustic music. Before discussing multimedia concepts, it is useful to consider comparisons between sound and visual objects.

A visual object has edges that mark its boundaries in space. An edge can also represent the intersection of surfaces, a change in illumination, or a change in texture (Handel, 2006: 397). “In sound, edges can be translated as rapid spectral or amplitude changes that can also represent different properties. An edge can mark the boundaries of an object, a louder sound heard against a quieter background, the intersection of two sounds, or the replacement or masking of one by another. But a rapid spectral or amplitude sound edge can also represent a change in illumination such as removing a shadow when the listener (or the sound source) moves out from behind an absorbing or reflecting object such as a wall” (Handel, 2006: 397).

According to Bregman (1990: 36-38) the auditory system primarily reveals sources whereas the visual system primarily reveals surfaces. In electroacoustic music however, sonic textures can be mimetic of visual surfaces. When edges are also considered in this context, analogies can be made between composing with sounds and composing with moving visual images. Sonic textures can represent continuous surfaces, while spectral and amplitude changes can represent discrete surface boundaries, surface intersections, changes in surface texture, and changes in surface illumination. Edges can also be marked off in space when spectral or amplitude changes are made at different points. This approach to sound can benefit from the fact that figure-ground organization and Gestalt organizational

principles can be applied to sound and visual objects. Therefore a compositional approach to electroacoustic music can be considered that is similar to composing with moving visual images. This approach will now be discussed through analysis of concepts normally applied to structuring moving visual images in multimedia projects such as film.

Compositing

Lev Manovich (2001: 136-141) has described the technique of digital compositing as a means of creating virtual spaces for new media. Compositing in cinema can be used to seamlessly integrate worlds of computer animation with real film footage. Images from various types of visual media can be layered and blended to create a new homogeneous image. Elements within a composite “are all aligned in perspective, and modified so that they have the same contrast and color saturation. To simulate depth of field, some elements are blurred while others are sharpened” (Manovich, 2001: 137).

Compositing can be used as an approach to the creation of sonic environments. Sounds from different sources can be composited, by applying similar processes to integrate disjointed heterogeneous sounds into a cohesive homogeneous form. Sounds can be blurred or sharpened through spectral processes. Compositing real and synthesized sounds in electroacoustic music is analogous to compositing real and animated footage in film.

A composite can also benefit from choice of sound material. Pierre Schaeffer suggested the idea of combining sound objects in a way that they appear to derive from a similar source, thus creating a genre of sound objects, or pseudo-instrument (Chion, 1983: 56-57). Dack (2002: 4-7) explains how the pseudo-instrument is implemented through consideration of the value/characteristic dualism. Common characteristics of sound objects are identified first. From these characteristics musical values can emerge, which enable sound objects to be structured even if they are dissimilar in other ways. Once values and characteristics have been identified, variance of values can be used as a structural function. Other characteristics stay permanent and contribute to the homogeneity of the genre (Dack, 2002: 16). An example of a pseudo-instrument is the combination of piano, cymbals and electronic sounds in Stockhausen’s *Kontakte* (1992): “Sound objects from these three distinct sources combine to produce the impression of a “metallic percussion-resonance” genre and thus a pseudo-instrumental source” (Dack, 2002: 17). Sound example 1 (25’47-26’19). The pseudo-instrument can be useful for choosing sound material from diverse sources that can be effectively integrated into a composite.

The idea of the pseudo-instrument was considered for my own piece *ac-1* to create a turbulent-chaotic genre of sound objects. Turbulent textures and chaotic gestures emerged as structural values. These values contributed towards compositing a turbulent-chaotic sonic environment, which also suggests images of a surreal visual landscape. Sound example 2 (0’50-2’46).

Spatial Montage

Whereas compositing can be used as an approach to blending and homogeneity in the creation of virtual spaces, heterogeneity can be effective through spatial montage. Manovich describes the difference between montage and compositing in the visual domain: “Montage aims to create visual, stylistic, semantic, and emotional dissonance between different elements. In contrast, compositing aims to blend them into a seamless whole, a single gestalt” (Manovich, 2001: 144). Montage has been traditionally used in film as a form of editing in the temporal domain. Manovich (2001: 148) calls this temporal montage. Spatial montage “could involve a number of images, potentially of different sizes and proportions, appearing on the screen at the same time. This juxtaposition by itself of course does not result in montage; it is up to the filmmaker to construct a logic that determines which images appear together, when they appear, and what kind of relationships they enter into with one another” (Manovich, 2001: 322).

Spatial montage can also be applied to form in electroacoustic music, and would involve two or more sounds appearing simultaneously in space. Sounds should be dissimilar in one respect, but some form of logic for their appearance and relationship is necessary. Sounds in a spatial montage could suggest contrasting images. Spatial montage can also be viewed as a form of counterpoint between sounds. In the sound example from Jonty Harrison's *Hot Air* (1995) there is a spatial montage containing inflating balloon sounds, machine sounds and nature sounds. As the piece progresses, the idea of hot air leads to the emergence of a theme of climate change, which enables these sounds to be meaningfully juxtaposed. There is a dialectical relationship between the machine and nature sounds that results in new meaning related to humanity's effect on the environment. The inflating balloon sounds entry at this particular point enables it to be interpreted as a metaphor for climate change, as it has become a sign of hot air and is a signal for the introduction of the other two sounds. Sound example 3 (16'48-17'20).

Space-medium

Another approach to the creation of virtual spaces in new media is the concept of space-medium. Manovich illustrates one of the problems of most virtual spaces within new media: "Although new media objects favor the use of space for representations of all kinds, virtual spaces are most often not true spaces but collections of separate objects" (Manovich, 2001: 253). He describes Florensky's concept of space-medium as a useful approach to the creation of virtual environments. According to Florensky: "The space-medium is objects mapped onto space... We have seen the inseparability of Things and space, and the impossibility of representing Things and space by themselves" (Florensky, 1985, cited in Efimova and Manovich, 1993: xxvi). When space is treated as space-medium, there is no real separation between space and the objects within. Therefore space-medium can relate to the substance of space, where there is less distinction between figure and ground as they blend into one. Manovich refers to Disney animations when explaining space-medium and how it relates to substance: "Although all objects in cartoons have hard edges, the total anthropomorphism of the cartoon universe breaks distinctions both between subjects and objects and objects in space. Everything is subjected to the same laws of stretch and squash, everything moves and twists in the same way, everything is alive to the same extent. It is as though everything - the character's body, chairs, walls, plates, food, cars, and so on - is made from the same bio-material. This monism of the cartoon worlds stands in opposition to" the dualism of foreground and space which are normally perceived as "fundamentally different substances" (Manovich, 2001: 256-257).

Space-medium can be applied to form in electroacoustic music when two or more sounds simultaneously occupy space in figure-ground relationships. Like composing, space-medium involves blending. Space-medium however, is suggested through ambiguity of figure-ground relationships. Through a merging of foreground and background, sounds can be given a fluid quality or appear to be made from the same substance. In the visual medium, Manovich compares this treatment of space to paintings of modern artists such as de Kooning, who "depicted a dense field that occasionally hardens into something that we can read as an object" (Manovich, 2001: 255). In Mathew Adkins *Melt* (2006) various sounds from a train journey dissolve through sonic processes that create ambiguous figure-ground relationships. The voice of the train announcer in particular takes on a fluid like quality, and appears to melt into the sonic substance of the piece. Sound example 4 (1'43-3'05).

Vectors

In film, television, and multimedia, vectors are applied to achieve structural relationships between images. Zettl describes a vector as "a force with a direction and magnitude" (Zettl, 1999: 106). The main attributes of vectors are vector field, vector magnitude and vector direction. Vectors interact within the vector field. The vector field can exist either spatially within a screen or temporally from

one shot to the next, as long as a strong enough connection between vectors is established. Vector magnitude signifies how strong or weak a vector is. The three properties of vector magnitude are direction, mass, and speed. Objects that have strong directional tendencies, are of large mass, or are moving fast are considered high-magnitude vectors. There are three kinds of vector direction in multimedia: “Continuing vectors point toward the same direction. Converging vectors point toward each other. Diverging vectors point away from each other” (Zettl, 1999: 109).

Vectors can be used to establish or analyze relationships between sounds. The vector field can exist both simultaneously within a sonic space, and through time across the length of a composition. In terms of spatial motion, a converging vector is created when sounds move towards the same destination. When sounds move away from a shared point they form diverging vectors.

Vectors can be applied to any sonic parameter that can be said to have direction. When pitches are described as high or low, up or down, this is essentially a mapping of pitch onto the domain of virtual space. Verticality of space becomes a metaphor for pitch height (Turner, 2006: 122-126). Vectors can be applied to pitch, as direction can be perceived in pitch space. For example, in *Metastasis* by Xenakis (2001) glissandi can be heard diverging from a G, with one group moving upwards while the other is moving downwards. Sound example 5 (0'00-1'04). Converging vectors can be perceived at the end of *Metastasis*, as glissandi moving from various points high and low in pitch space converge towards a Gsharp. Sound example 6 (8'00-8'54). In Xenakis' *Syrmos* (2005), continuing pitch vectors are formed by glissandi continuously moving from high to low in pitch space. Sound example 7 (6'32-6'57).

As well as the verticality of space metaphor, a more basic “movement through space” metaphor affords the application of vectors to any sonic behaviour. Sounds can thus converge towards or diverge from a point that relates to their shared behaviour. Sounds can also continue similar behaviours indefinitely. Converging vectors can be perceived in my own piece *ac-4*. After a rhythmic sound enters, two vibrating sounds increase in tension and converge towards a breaking point, where it appears as though the rhythmic sound has been squeezed out. The rhythmic sound reenters at the end of this chaotic point of convergence, where sounds then appear to break apart. Sound example 8 (12'11-12'58).

Vectors can be applied as structural functions throughout a composition. The perceived direction, mass, or speed of vectors can be strong or weak, and these attributes of vector magnitude can be useful in assessing the dynamics of a piece. As well as space, pitch and sonic behaviour, further research can provide analysis of vectors applied to other musical parameters.

Conclusion

Multimedia is a rich source not only for audio-visual composition but sound composition also, particularly when comparisons between sound and visual objects are considered. The concepts of compositing, spatial montage and space-medium can be combined or used separately as an approach to form in electroacoustic music. Heterogeneity can be effective through spatial montage, while disjointed sounds from different sources can be integrated into a more cohesive and homogeneous form through compositing. Space-medium can be applied to suggest space as homogeneous substance, where figure-ground relationships are ambiguous. Both compositing and space-medium are particularly evident in Mathew Adkins *Melt*, while Jonty Harrison's *Hot Air* contains many examples of spatial montage. Further relationships between sounds can be considered through the concept of vectors. Vectors have been demonstrated through Xenakis' use of pitch glissandi in particular, but they can also be applied to various other parameters.

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