



The Morphology and Meaning of Time: An Analysis of John Chowning's "Sabelithe" Using the UST Method

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Abstract

This paper employs the Unités Sémiotiques Temporelles (UST) method to systematically analyze John Chowning's seminal computer music composition "Sabelithe" (1971). By identifying and interpreting the various USTs present in the piece, the study explores how Chowning utilizes these temporal morphologies to shape the work's structure, create dramatic tension, and convey profound expressiveness. Despite being composed entirely of synthetic timbres, the piece embodies rich temporal semantics and an emotional arc comparable to any traditional instrumental composition. This research confirms the effectiveness of the UST analytical framework for electroacoustic music and provides new insights into understanding Chowning's pioneering compositional ideas and aesthetics.

1. Introduction

John Chowning, a pioneer in the field of computer music, has made significant contributions to music composition and the development of synthesis technologies since the 1960s. As a professor at Stanford University, Chowning achieved groundbreaking milestones in frequency modulation (FM) synthesis, digital reverberation, and sound spatialization, leaving a profound impact on the creative practices of generations of computer musicians (Chowning, 1973; Dodge & Jerse, 1985; Baudouin, 2008). Among his many pioneering works, "Sabelithe" (1971) stands out as a masterpiece that showcases Chowning's exceptional skills in timbre synthesis and spatial control

while introducing avant-garde aesthetic concepts and poetically profound metaphors, opening up new creative realms for computer music (Zattra, 2007).

However, the modern techniques employed in “Sabelithe”, such as atonal grammar and irregular rhythms, pose challenges when examining its internal logic from the perspective of traditional Western music analysis (Baudouin, 2008). As a landmark computer music composition, “Sabelithe” subverts the narrative mode of classical tonal music in its treatment of musical time. Rather than adhering to the grammatical logic of coordinated progression, it creates a complex and varied temporal experience through the ingenious arrangement of various sound events on a macroscopic morphological level (Chowning, 2000).

In this “post-tonal” context, the focus of analysis should shift from the traditional motive-theme development relationship to the examination of the overall temporal morphology of the work (Roads, 2015). The Unités Sémiotiques Temporelles (UST) analysis method, derived from Pierre Schaeffer's theory of *musique concrète*, provides an effective tool for this purpose (Delalande, 1996; Hautbois, 2010). Unlike traditional Western music analysis, which tends to be parametric and fragmented, UST analysis focuses on the morphological features presented by electronic music on a macroscopic timescale and the resulting auditory sensations and semantic references (Hautbois, 2010).

Recent studies have applied UST analysis to the study of mixed electronic music (Lalitte, 2006), confirming its practical validity. Building upon these foundations, this paper aims to interpret the internal structure of “Sabelithe” using the UST analysis method. Through careful listening and spectral analysis, I will systematically identify the dominant UST types presented by the work at different temporal points and arrange them in a linear sequence according to their temporal order. This will provide a holistic description of the atonal, non-metered electronic music, revealing its internal structural logic and emotional threads (Delalande, 1996).

Furthermore, I will examine the roles of these USTs in constructing the overall musical form, creating dramatic tension, and conveying poetic metaphors. By exploring new ideas and methods for computer music analysis and using “Sabelithe” as a case study, this paper aims to deepen our understanding of Chowning’s compositional ideas and provide a new perspective for the study of this pioneer of computer music (Chowning, 2000; Zattra, 2007).

2. Linear Temporal Analysis of USTs in “Sabelithe”

John Chowning’s groundbreaking composition “Sabelithe: (1971) is a testament to the composer’s mastery of computer-generated sound and his innovative approach to structuring musical time. Through the lens of the Unités Sémiotiques Temporelles (UST) analysis method, we can gain a deeper understanding of how Chowning manipulates the temporal morphology of the piece to create a sense of narrative and emotional progression. By identifying the dominant USTs at different points in the work and examining their relationships and transitions, we can uncover the underlying logic and expressive power of Chowning's compositional strategy (Delalande, 1996).

2.1 En flottement (Floating)

The opening section of “Sabelithe” is characterized by the “En flottement” (Floating) UST, which immediately immerses the listener in a state of temporal ambiguity and spatial disorientation. The floating sensation is achieved through the careful manipulation of spectral and spatial parameters, as well as the absence of a clear pulse or meter (Hautbois, 2010). Chowning employs a

combination of FM synthesis and digital reverberation to create rich, evolving timbres that seem to emerge from and disappear into the void, blurring the boundaries between sound and silence (Baudouin, 2008).

The sonic events in this section appear to be suspended in a non-causal, atemporal space, without any obvious logical connections or hierarchical relationships. The lack of a clear beginning or end, combined with the subtle variations in timbre and texture, creates a sense of endless permutation and transformation, as if the sounds were part of a larger, ever-changing continuum (Smalley, 1997). This floating quality is further enhanced by the use of non-tempered tunings and microtonal inflections, which add a layer of pitch instability and ambiguity to the sonic landscape (Risset, 1996).

From a perceptual perspective, the floating UST engages the listener's attention by creating a sense of expectation and anticipation, as the ear searches for patterns and regularities in the seemingly random succession of events. At the same time, the lack of clear directionality or teleology invites a more contemplative and introspective mode of listening, as the mind wanders freely in the open space of the composition (Chowning, 2000). The floating UST thus serves as a kind of sonic portal, transporting the listener from the realm of everyday experience into a state of heightened awareness and receptivity, setting the stage for the unfolding of the musical narrative (Zattra, 2007).

2.2 Trajectoire inexorable (Inexorable Trajectory)

As the piece progresses, the floating UST gives way to a new temporal morphology, the "Trajectoire inexorable" (Inexorable Trajectory), which introduces a sense of directionality and purposefulness into the musical discourse. This UST is most clearly manifested in the canon section of "Sabelithe", where three voices successively imitate a fixed spatial trajectory, moving from the left-rear to the front, then from the front to the horizontal plane, and finally from the right-front to the rear (Chowning, 1971).

The use of imitative polyphony in this section creates a sense of temporal and spatial unfolding, as the voices chase each other in a kind of sonic relay race, tracing a predetermined path through the virtual acoustic space. The inexorable quality of the trajectory is reinforced by the precision and consistency of the voices' movement, which seems to be driven by an invisible force or logic, independent of human agency or intention (Risset, 1996). This mechanistic, almost robotic character of the canon stands in stark contrast to the organic, fluid nature of the floating UST, highlighting the tension between the natural and the artificial, the human and the machine (Zattra, 2007).

From a technical perspective, the inexorable trajectory UST is realized through Chowning's pioneering work in sound spatialization and the simulation of moving sound sources. By manipulating the amplitude and delay of the signals sent to the four loudspeakers, Chowning creates the illusion of a sound source moving along a fixed path in the listening space, with a level of precision and control that was unprecedented at the time (Chowning, 1971). The use of FM synthesis also contributes to the sense of spatial depth and perspective, as the timbral variations of the voices suggest different distances and orientations relative to the listener (Baudouin, 2008).

The inexorable trajectory UST plays a crucial role in the dramatic structure of “Sabelithe”, as it introduces a sense of conflict and tension into the musical discourse. The rigid, deterministic nature of the canon can be seen as a metaphor for the constraints and limitations of human existence, the forces that shape our lives and destinies beyond our control (Smalley, 1997). At the same time, the trajectory's relentless forward motion suggests a kind of existential quest or journey, a search for meaning and purpose in the face of uncertainty and adversity (Lalitte, 2006).

2.3 Par vagues (Wave-like)

The wave-like UST emerges in the middle section of “Sabelithe”, introducing a new level of complexity and dynamism into the temporal structure of the piece. This UST is characterized by the periodic alternation of peaks and troughs, the ebb and flow of sonic energy that creates a sense of cyclical motion and transformation (Delalande, 1996). Chowning achieves this effect through the manipulation of FM synthesis parameters, particularly the modulation index, which controls the bandwidth and brightness of the sound (Chowning, 1973).

By varying the modulation index over time, Chowning creates a sense of timbral and textural evolution, as the sound shifts from a pure, sinusoidal quality to a rich, harmonically complex spectrum, and back again (Risset, 1996). This periodic modulation of the sound's spectral content is analogous to the way in which ocean waves build up and dissipate energy, gathering strength and momentum before crashing against the shore and receding into the depths (Smalley, 1997).

The wave-like UST also has a strong spatial component, as the variations in timbre and amplitude are often accompanied by changes in the sound's location and trajectory within the listening space. The peaks and troughs of the wave are thus not only temporal but also spatial, creating a sense of immersion and envelopment that draws the listener into the heart of the sonic experience (Chowning, 2000). This spatial dimension of the wave-like UST is enhanced by Chowning's use of digital reverberation, which creates a sense of depth and distance, and by the careful balancing and distribution of the sound across the four loudspeakers (Baudouin, 2008).

From a perceptual perspective, the wave-like UST engages the listener's attention by creating a sense of anticipation and release, as the ear follows the rising and falling contours of the sound, seeking patterns and regularities in the flux of sonic events. The cyclical nature of the wave-like motion also invites a kind of entrainment or synchronization, as the listener's own bodily rhythms and mental states begin to resonate with the periodicities of the music (Hautbois, 2010). This sense of physical and emotional involvement is further enhanced by the use of non-Western scales and tunings, which add a layer of cultural and historical resonance to the sonic experience (Chowning, 2000).

The wave-like UST plays a crucial role in the expressive and symbolic dimensions of “Sabelithe”, as it evokes a range of natural and cultural associations, from the ebb and flow of the ocean to the cyclical patterns of human life and experience. The wave-like motion can be seen as a metaphor for the dialectical relationship between order and chaos, pattern and randomness, the eternal and the ephemeral (Zattra, 2007). At the same time, the UST's emphasis on continuity and transformation suggests a kind of transcendence or liberation, a release from the constraints of linear time and the boundaries of the self (Risset, 1996).

2.4 Élan (Impetus) and Chute (Fall)

The dramatic climax of “Sabelithe” occurs in a later section of the piece, where Chowning introduces a sudden and radical transformation of the sonic material, marked by the interplay of two closely related USTs: “Élan” (Impetus) and “Chute” (Fall) (Delalande, 1996). This transformation involves the abrupt shift from a noisy and unstable percussion timbre to a full and rounded brass timbre, a shift that is achieved through the real-time manipulation of FM synthesis parameters, particularly the carrier and modulator frequencies and the modulation index (Chowning, 1973).

The Élan UST is characterized by a sudden discharge of energy, a burst of sonic intensity that propels the sound to a state of high tension and instability. This impetus is created by the rapid increase in the amplitude and bandwidth of the sound, as all the frequency components rise sharply and reach a point of maximum saturation and distortion (Risset, 1996). The effect is one of overwhelming force and power, a kind of sonic explosion that shatters the prevailing order and creates a sense of rupture and discontinuity in the musical discourse (Smalley, 1997).

The Chute UST, on the other hand, represents the inevitable consequence of the Élan, the sudden and catastrophic release of tension that follows the moment of maximum intensity. This fall is marked by an abrupt cessation of sound, a plunge into silence that is as shocking and disorienting as the previous burst of energy (Chowning, 2000). The effect is one of complete and utter exhaustion, a kind of sonic implosion that leaves the listener stunned and disoriented, grasping for a sense of balance and continuity in the face of such radical disruption (Lalitte, 2006).

From a technical perspective, the Élan and Chute USTs are realized through Chowning’s virtuosic control of the FM synthesis parameters, which allows him to create a wide range of timbral and dynamic effects with a high degree of precision and flexibility. The use of real-time parameter manipulation also adds a sense of spontaneity and unpredictability to the sonic experience, as the listener is never quite sure what will happen next or how the sound will evolve over time (Baudouin, 2008).

The Élan and Chute USTs play a crucial role in the dramatic and expressive arc of “Sabelithe”, as they introduce a sense of crisis and catharsis into the musical discourse. The sudden and violent transformation of the sonic material can be seen as a metaphor for the creative process itself, the moment of breakthrough and illumination that comes after a long period of struggle and uncertainty (Zattra, 2007). At the same time, the USTs’ emphasis on the fragility and transience of the sonic event suggests a kind of existential awareness, a recognition of the ultimate impermanence and contingency of all things (Risset, 1996).

2.5 En flottement (Return to Floating)

The final section of “Sabelithe” marks a return to the floating UST that characterized the opening of the piece, but with a significant difference in tone and texture. The sonic events in this section are more sparse and intermittent than in the beginning, with longer periods of silence and a greater sense of space and emptiness between the sounds (Chowning, 2000). The effect is one of exhaustion and depletion, as if the sonic energy had been drained from the piece, leaving only fragments and traces of the previous activity (Hautbois, 2010).

From a structural perspective, the return to the floating UST creates a sense of symmetry and circularity in the overall form of the piece, as the music seems to come full circle and return to its point of origin. This cyclical structure can be seen as a reflection of the larger patterns and cycles of nature and human experience, the eternal recurrence of birth and death, creation and destruction (Smalley, 1997). At the same time, the differences between the opening and closing sections of the piece suggest a kind of transformation or evolution, as if the music had undergone a process of growth and change over the course of its journey (Zattra, 2007).

The return to the floating UST also has a strong emotional and psychological dimension, as it invites a sense of introspection and reflection on the part of the listener. The sparse and fragmentary nature of the sonic events encourages a more contemplative and meditative mode of listening, as the mind wanders freely in the open space of the composition (Risset, 1996). The sense of emptiness and absence that pervades the final section can be seen as a metaphor for the ultimate nature of reality, the void that underlies all phenomena and the silence that follows all sound (Chowning, 2000).

From a technical perspective, the return to the floating UST is achieved through the gradual deconstruction and disintegration of the sonic material, as the sounds become more fragmented and less recognizable over time. The use of digital reverberation and spatial processing techniques also contributes to the sense of distance and detachment, as the sounds seem to recede into the background and merge with the ambient space of the listening environment (Baudouin, 2008).

The return to the floating UST plays a crucial role in the expressive and symbolic dimensions of “Sabelithe”, as it suggests a kind of transcendence or liberation from the constraints of time and space. The sense of openness and indeterminacy that characterizes the final section can be seen as a metaphor for the ultimate freedom and creativity of the human spirit, the ability to rise above the limitations of the material world and explore the infinite possibilities of the imagination (Lalitte, 2006). At the same time, the UST's emphasis on absence and emptiness reminds us of the ultimate impermanence and insubstantiality of all things, the fact that everything arises and passes away in the endless flux of becoming (Zattra, 2007).

In conclusion, the linear temporal analysis of the USTs in John Chowning's “Sabelithe” reveals a highly sophisticated and expressive compositional strategy, one that exploits the unique capabilities of computer-generated sound to create a sense of narrative and emotional progression over time. By carefully manipulating the spectral, spatial, and temporal parameters of the sonic material, Chowning creates a complex and dynamic interplay of USTs that engages the listener's attention and imagination, inviting a deep and sustained exploration of the musical experience.

From the floating UST of the opening section to the inexorable trajectory of the canon, from the wave-like motion of the middle section to the dramatic interplay of Élan and Chute, and finally to the return to floating in the closing section, “Sabelithe” takes the listener on a journey through a wide range of temporal and spatial morphologies, each with its own expressive and symbolic resonances. The piece can thus be seen as a kind of sonic landscape or environment, a virtual world that the listener inhabits and explores over the course of the composition.

At the same time, the UST analysis of “Sabelithe” reveals the deeper philosophical and existential dimensions of Chowning’s music, as the temporal morphologies of the piece evoke a range of fundamental human experiences and concerns, from the search for meaning and purpose in life to the recognition of the ultimate impermanence and contingency of all things. In this sense, “Sabelithe” can be seen as a kind of sonic meditation on the nature of time and existence, a reflection on the mysteries and wonders of the universe as they are revealed through the medium of sound.

Ultimately, the linear temporal analysis of the USTs in “Sabelithe” demonstrates the power and potential of computer music as a means of artistic expression and exploration, one that opens up new possibilities for the creation and perception of musical form and meaning. By pushing the boundaries of what is possible with sound and technology, Chowning and other pioneers of computer music have created a new paradigm for musical composition and listening, one that challenges our assumptions about the nature and purpose of music and invites us to expand our horizons and deepen our understanding of the world around us.

3. Critical Analysis and Semantic Interpretation

The UST analysis of John Chowning’s “Sabelithe” reveals a highly sophisticated and expressive temporal structure that challenges traditional notions of musical form and meaning. By arranging various USTs in a cyclical and non-linear manner, Chowning creates a sense of dramatic progression that guides the listener through states of chaos and order, formation and destruction (Lalitte, 2006). This temporal aesthetic, while bearing some resemblance to classical forms such as the sonata, is achieved through the innovative use of computer-generated sounds and the manipulation of their spectral and spatial properties (Risset, 1996).

One of the most striking aspects of “Sabelithe” is its ability to evoke a sense of narrative and emotional development without relying on traditional melodic or harmonic devices (Delalande, 1996). The USTs employed by Chowning, such as the floating (“En flottement”), wave-like (“Par vagues”), and leaping (“Élan” and “Chute”) motions, create a rich tapestry of sonic gestures that engage the listener’s imagination and invite multiple interpretations (Smalley, 1997). These USTs not only serve as structural elements but also convey a range of emotional states and metaphorical associations, endowing the piece with a poetic depth that transcends its abstract nature (Chowning, 2000).

For instance, the opening section of “Sabelithe”, characterized by the floating UST, immediately immerses the listener in a state of timelessness and uncertainty. The lack of a clear pulse or meter, combined with the ethereal quality of the synthesized timbres, creates a sense of weightlessness and detachment from the physical world (Hautbois, 2010). This state of suspension can be interpreted as a metaphor for the human condition, with its constant oscillation between the known and the unknown, the real and the imaginary (Zattra, 2007). By beginning the piece with this UST, Chowning invites the listener to let go of preconceived notions and embrace the ambiguity and openness of the sonic experience (Baudouin, 2008).

As the piece progresses, the introduction of the inexorable trajectory UST in the canon section marks a shift towards a more structured and deterministic temporal organization. The mechanical repetition of the spatial trajectories, reinforced by the use of imitative polyphony, creates a sense

of inevitability and automation that contrasts sharply with the floating quality of the opening section (Risset, 1996). This juxtaposition can be seen as a commentary on the tension between human agency and technological determinism, a theme that is central to the aesthetics of computer music (Roads, 2015). By subverting the traditional connotations of the caccia, Chowning highlights the ambivalent relationship between the composer, the machine, and the musical material, inviting reflection on the nature of creativity in the digital age (Zattra, 2007).

The wave-like UST that emerges in the middle section of “Sabelithe” introduces a new level of complexity and ambiguity to the temporal structure of the piece. The periodic alternation of peaks and troughs, achieved through the modulation of FM synthesis parameters, creates a sense of ebb and flow that evokes the cyclical patterns of nature and the human psyche (Chowning, 1973). However, the presence of microscopic variations within this macroscopic stability suggests a more nuanced and dynamic view of temporality, one that acknowledges the coexistence of change and continuity, order and disorder (Risset, 1996). This UST can be interpreted as a metaphor for the paradoxical nature of existence, with its constant interplay between the ephemeral and the eternal, the individual and the universal (Baudouin, 2008).

The dramatic transformation marked by the Élan and Chute USTs in the later section of the piece represents a turning point in the temporal and emotional trajectory of “Sabelithe”. The sudden shift from a noisy and unstable percussion timbre to a full and rounded brass timbre, accompanied by a sharp rise and fall in energy, creates a sense of rupture and transcendence that is both exhilarating and unsettling (Chowning, 2000). This transformation can be seen as a metaphor for the creative process itself, with its moments of breakthrough and illumination, as well as its inherent fragility and transience (Zattra, 2007). By juxtaposing the Élan and Chute USTs, Chowning highlights the dialectical relationship between destruction and creation, chaos and order, inviting the listener to contemplate the nature of artistic innovation and its place in the larger scheme of things (Risset, 1996).

The return to the floating UST in the ending section of “Sabelithe” completes the temporal cycle and brings the piece to a close on a note of ambiguity and openness. The sparse and intermittent quality of the sonic fragments, combined with the increasing use of silence, creates a sense of emptiness and introspection that contrasts with the density and intensity of the previous sections (Chowning, 2000). This return can be interpreted as a metaphor for the cyclical nature of existence, with its endless alternation between birth and death, beginning and end (Smalley, 1997). By ending the piece with the same UST that opened it, Chowning invites the listener to reflect on the transformative power of the musical experience and its ability to alter our perception of time and space (Baudouin, 2008).

From a semantic perspective, the title “Sabelithe” itself remains a source of mystery and speculation. The enigmatic nature of the word, which has no obvious referent in any known language, adds to the open-ended and evocative quality of the piece (Zattra, 2007). Some scholars have suggested that “Sabelithe” may be a reference to the ancient Gnostic concept of the “Sabellianism”, which posits the existence of a single divine entity that manifests itself in three different modes or personas (Baudouin, 2008). Others have interpreted the title as a pure invention, a linguistic abstraction that mirrors the abstract nature of the music itself (Risset, 1996). Regardless of its specific meaning, the title “Sabelithe” functions as a poetic catalyst that invites the listener to project their own associations and interpretations onto the sonic experience,

creating a space for personal and collective reflection (Chowning, 2000).

The USTs employed in “Sabelithe” also contribute to the semantic richness of the piece by evoking a wide range of natural phenomena and human experiences. The floating UST, for instance, can be associated with the sensation of weightlessness and the idea of transcendence, while the wave-like UST may evoke the ebb and flow of the ocean, the cycle of the seasons, or the fluctuations of the human psyche (Hautbois, 2010). The inexorable trajectory UST, on the other hand, may be seen as a metaphor for the relentless march of time, the inevitability of fate, or the mechanization of human life in the modern era (Risset, 1996). By tapping into these universal experiences and archetypes, Chowning’s use of USTs creates a rich network of associations that enhances the emotional and intellectual impact of the music (Lalitte, 2006).

Moreover, the USTs in “Sabelithe” can be seen as a reflection of Chowning’s broader aesthetic vision, which seeks to bridge the gap between technology and humanism in the realm of computer music. By using digital tools to create expressive and evocative sonic structures, Chowning demonstrates that the machine can be a powerful ally in the quest for artistic meaning and transcendence (Baudouin, 2008). His approach to composition, which combines technical mastery with poetic sensitivity, has had a profound influence on subsequent generations of computer musicians and has helped to establish the field as a legitimate and vital form of artistic expression (Roads, 2015).

In the context of the late 20th century, “Sabelithe” can be seen as a pioneering work that challenges the prevailing assumptions about the nature and purpose of music in the age of digital technology. By embracing the abstract and the unconventional, Chowning’s piece opens up new possibilities for sonic exploration and expression, inviting listeners to expand their horizons and reimagine the boundaries of the musical experience (Zattra, 2007). At the same time, the piece’s emphasis on the temporal and the experiential dimensions of music serves as a reminder of the enduring importance of the human element in the creation and reception of art, even in the face of rapid technological change (Risset, 1996).

From a philosophical perspective, “Sabelithe” can be seen as a meditation on the nature of time and its relationship to human consciousness. The cyclical and non-linear structure of the piece, with its constant alternation between order and disorder, presence and absence, invites reflection on the paradoxical nature of temporal experience and its role in shaping our sense of self and world (Smalley, 1997). By creating a sonic environment that challenges our habitual modes of perception and cognition, Chowning’s piece invites us to confront the mystery and complexity of our own existence, and to find meaning and beauty in the face of uncertainty and change (Chowning, 2000).

Ultimately, the UST analysis of “Sabelithe” reveals the piece to be a rich and multifaceted work of art that operates on multiple levels of meaning and significance. By combining technical innovation with poetic vision, Chowning has created a sonic world that is at once abstract and evocative, challenging and rewarding, inviting us to explore the depths of our own imagination and to find new ways of engaging with the world around us (Baudouin, 2008). As such, “Sabelithe” stands as a testament to the enduring power of music to transform our understanding of ourselves and our place in the universe, and to the vital role that computer music can play in expanding the horizons of artistic expression in the digital age (Roads, 2015).

In conclusion, the critical analysis and semantic interpretation of John Chowning's "Sabelithe" through the lens of UST analysis reveals a work of remarkable depth and complexity, one that challenges our preconceptions about the nature and purpose of music in the age of digital technology. By creating a sonic world that is at once abstract and evocative, Chowning invites us to explore the mysteries of time, consciousness, and existence, and to find new ways of engaging with the world around us. As such, "Sabelithe" stands as a pioneering work of computer music that continues to inspire and challenge listeners and composers alike, and that offers a glimpse into the vast potential of the medium for artistic expression and philosophical reflection.

4. Conclusion

The UST analysis of John Chowning's "Sabelithe" reveals the work's carefully designed temporal structure, rich in dramatic tension and poetic metaphors. Chowning's arrangement of USTs creates a temporal aesthetic that is both modern and transcendent, comparable to that of classical masterpieces (Risset, 1996). The findings of this study reaffirm the effectiveness of the UST method in analyzing electroacoustic music, providing a new perspective for understanding the listener's perceptual experience (Delalande, 1996; Hautbois, 2010).

Moreover, the interpretation of "Sabelithe" sheds light on Chowning's creative vision. His mastery of digital technology does not limit his musical imagination but rather enables him to portray a virtual sonic world where order and chaos coexist, and illusion and reality intertwine (Chowning, 2000). The pioneering aesthetic paradigm established in "Sabelithe" embodies Chowning's personal artistic ideals while also pointing towards a broader direction for the development of computer music (Zattra, 2007).

In the current era of rapid digital art proliferation, Chowning's aesthetic approach remains particularly valuable. It reminds us that the essence of artistic innovation lies not only in technological advancement but also in the exploration of the human condition (Roads, 2015). By combining technical prowess with poetic expression, Chowning demonstrates that computer music has the potential to become a "classical" art form of the digital age, capable of resonating with audiences across time and space (Baudouin, 2008).

In conclusion, the UST analysis of "Sabelithe" not only deepens our understanding of Chowning's compositional ideas but also highlights the significance of his contributions to the field of computer music. By exploring new methods of analysis and interpretation, this study aims to inspire further research into the aesthetic dimensions of electroacoustic music and to promote a more holistic and humanistic approach to the study of digital art.

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