Developing a Socio-Historical Model for Electro-Acoustic Music Analysis: The Challenge from an Adornian Perspective

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ABSTRACT

Today's electro-acoustic music (EAM) reflects an incredible range of modes for generating and organizing sound in space and time, often resulting in works that defy traditional understanding of music itself. The robust socio-historical musical diversity of EAM, along with its still evolving nature, leaves this new music genre with a tentative semantic model to help in its study, analysis, and interpretation. Using perspectives of 20th century philosopher and music theoretician Adorno, this paper aims to addresses the need for, and challenges of, developing such a model. We also describe positive steps taken toward addressing these challenges through collaborative efforts in creating a hub for the collection, preservation, and exploration of EAM under the Electro Acoustic Music Mine (EAMM) project.

1. INTRODUCTION

Electro-acoustic music (EAM) is an artform that has grown in tandem with technological developments enabling the realization of sonic possibilities beyond the limitations of human performers and the mechanics of acoustic instruments. EAM has also enabled the production of compositions that have transcended and challenged traditional musical paradigms from every cultural heritage. In effect, the advent of digital technologies has led to the global growth of EAM as a new subset of the music culture. In this paper, we use the term "electro-acoustic music" to represent a genre of *new music* practiced primarily by members of this subset, whose interests are focused on aesthetics, music theory, sound synthesis, new methodologies for musical expression, rather than on commercial appeal.

The fact that EAM has been introducing challenging and diverse thoughts to the traditional world of music is not in itself a new phenomenon. Since the early 20th Century, fundamental premises of Western classical music have been challenged and its boundaries have been radically extended. What is new and different about the musical challenges of EAM, however, is that unlike earlier music that came before it, a clear basis for the analysis of EAM is still plagued by murkiness: for non-EAM music, standards were somewhat well established and recognized thus providing a basis for

analyzing and comparing the old with the new. Through its global development, EAM is both influenced by, and a reaction to, a cross-cultural and anachronous collection of different musical genres that defy simple interpretation into a common basis or model of shared meaning and analysis. And without such a basis, it is difficult to compare with confidence, say, the *acousmatic* compositions of any two composers, since techniques and technologies shared across various modes of expression can entail fundamentally different collections of compositional backgrounds and grammars.

This unique situation of EAM appears to demand the development of a shared semantic model that would allow EAM practitioners and theorists to meaningfully identify and evaluate common and distinctive features that may underlie the great diversity of today's EAM works. Such a model could also benefit the study of EAM not only in terms of its artistic value but also—and perhaps more importantly—in terms of how EAM contributes to the continuation of the dialectic path of musical progress, especially if the model forms a *constellation*[1] of EAM particularities beyond simply combining new technologies with past musical contexts and standards. This dialectical concept was a key issue for the noted 20th century philosopher and music theorist Theodore Adorno, whose views about the dialectical advancement of music were strongly coupled to his perceived dialectical advancement of mankind itself. Evaluating progress in either, he contends, presupposes a historical model whose ideology, structure and standards can be identified, questioned and challenged upon.

While producing such a model for EAM is not the purpose of this paper, proposing further steps toward its development is one of our goals. We will use an Adornian perspective to help clarify steps that could be taken to provide a general framework for discussion and analysis. Our proposal certainly does not embrace all of Adorno's views and conclusions about what counts as "new" or "good" music, however. Accordingly, we will first discuss fundamental concepts of Adorno that are relevant to our topic in Section 2 and then proceed to elaborate on how they apply to the

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[1] Constellation, according to Adorno, "illuminates the specific side of the object, the side which to a classifying procedure is either a matter of indifference or a burden" [1]. We have used the concept to address the state where a systematic whole and the particularities within form a relationship of dialectic tension as opposed to total fragmentation or absolute integration.

current state of EAM in Section 3. We then discuss some of the idiosyncratic challenges in developing an EAM model, introduce steps on how these challenges might be met, and steps that we currently taking in addressing some of these challenges in the context of the Electro Acoustic Music Mine (EAMM) project (Section 4).

2. ADORNO'S PERSPECTIVE

Adorno's Critical Theory represents a philosophy of social science in which human thinking, values, and development cannot be explained solely and simply in terms of the interactions of fundamental atomic particles, but must also include the influence of social elements. When enough humans interact, a social entity forms—commonly called a society—which is not merely the sum of its members but rather a qualitatively new, higher level physical entity that takes on characteristics and influences of its own. These characteristics include an overarching ideology that influences the thinking, values and actions of its members in the areas of politics, economics, ethics, art, and more.

While the ideology of a society allows it to progress along its own ideological lines, the Adornian School does not consider this, in itself, true social progress. As a higher order social entity, and under the right conditions, a society has a natural drive (or *telos*) to become utopian. But history has shown that established ideologies not only have failed to foster such utopian conditions but have even suppressed or negated their development with opposing elements. As a result, true social progress has been made—and will continue to be made—by challenging and displacing the overarching ideology itself, rather than simply making improvements within it. Thus, *true* social progress, Adorno contends, tends to be more revolutionary than evolutionary, with prevailing ideological theses being rather jarringly replaced by their perceived antithetical improvements. Such was the perceived progression from feudalism to capitalism to communism. And more important to our discussion, such is also the perceived progression of another higher order social phenomenon—namely, music—as it *progressed*, for example, from Classical to Romantic to Modern Music.

Such seems to be the case with EAM. With composers of EAM from around the world expressing a greater range of artistic freedom with an expanded range of musical materials and conventions—and with no clearly shared framework or model of what constitutes EAM, it is difficult to elaborate on how much of EAM reflects something genuinely new as opposed to reflecting a mere recasting of pre-established norms and techniques. As experimental EAM compositions are continually created and shared at academic settings, being able to discern what's genuinely new from mere recastings of extant ideologies could provide important theoretical and aesthetic insights that guide further musical experimentation, expression and progress.

From Adorno's perspective, a lack of shared analytical tools for EAM makes its appreciation difficult beyond merely deciphering composers' sonic intentions or describing general tendencies of the music or ear-grabbing moments of a particular piece. But having such analytical tools allows appreciation of what Adorno calls the inherent "dual nature" of a piece of music—namely, the dialectic tension between each musical element's unique, socio-historical essence, on the one hand, versus the integrated wholeness of the work toward which the composer strives, on the other hand. Thus, for Adorno, a musical work operates as "a force-field organized around a problem," [1] wherein analysis is an indispensable process for composition, critical listening, and the evolution of music.

3. ELECTRO-ACOUSTIC MUSIC

In *Adorno's Aesthetics of Music*, Paddison emphasizes Adorno's point that musical material is always historically and socially mediated [2]. A good example is the evolution of western music to the avant-garde music of the 1960s, whose immediate historical origin was consciously viewed to be Webern's music that was set, antithetically, against that of Schoenberg by Pierre Boulez. In this way, serialist materials could be culturally enriched from the overarching historical narrative.

With EAM, however, it is difficult to simply assume such socio-historical mediation because it emerged as a viable cultural phenomenon only after the so-called disintegration of the progressive history of music, as Adorno claimed [3]. While tagged under the umbrella term "EAM," instances of this category have not clearly constituted (nor resisted) a unified cultural understanding of EAM, either historically or socially. This "unified cultural understanding" need not mean some fixed, comprehensive concept encompassing every instance of EAM; we rather refer to a dynamic concept that captures a general *constellation* of EAM works, wherein each work also reflects a constellation of its socio-historical relations with other things.

Toward developing a more unified cultural understanding—or semantic model of EAM—we consider whether Adorno's three-step analytical methodology applies to the analysis of EAM. As summarized by Paddison, this three-step methodology consists of: (1) Immanent Music Analysis – involving the technical understanding of formal details and musical structure; (2) Sociological Critique – involving how well the dialectical tension between musical elements achieves the intended wholeness of the work; and (3) Philosophical-Historical Interpretation – involving how well the music reflects the social views and circumstances of the times [4].

We noted that the first step was resonant with our own efforts of employing a systematic approach for extracting quantitative, measurable, and objective information from audio files by embracing music information retrieval (MIR)

techniques [5] for EAM compositions. The focus of this research was to gain insight into elements of timbre, form, segments, events, and musical structure. In SQEMA [6] we argue for a systematic analysis methodology divided into six steps, beginning as shown in Figure 1 with (I) multiple listening, (II) high-level analysis (form), (III) mid-level analysis (segments), (IV) event level analysis, (V) reexamination, and (VI) aesthetic interpretation. The first five steps are rooted in technical analysis whereby sonic elements that can actually be found and measured in the signal form the basis of developing an analytical narrative; this is further elaborated in [5], where we introduce the Easy Toolbox software system.
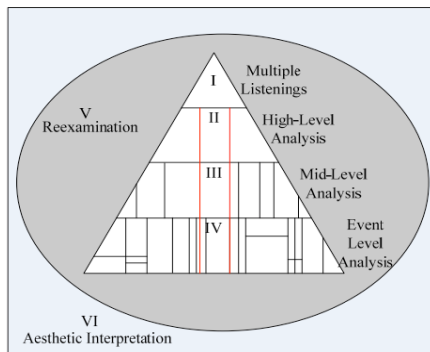

Figure 1. SQEMA Model.

Aesthetic interpretation (step VI) involves subjective components produced in previous steps, along with extra musical and subjective information produced from a myriad of other sources. As noted in the SQEMA paper, we acknowledge that our current systematic, data-driven methodology is, by itself, insufficient for delivering a comprehensive aesthetic interpretation [6] – a shortcoming that could conceivably be approached in the latter steps of the Adorno's analytical model. Adorno himself, as Paddison points out, was not always successful in making the logical transition from technical analysis to sociological critique in any empirically rigorous way [2]. This was partly because Adorno did not explicitly delineate the musical grammar upon which a piece of music is written and subsequently analyzed. Technical examination of musical materials is important but can also result in "ambiguous floating" without a concrete grasp of how the materials, in their organization relate socio-historical dimensions.

To overcome this analytical impediment, we believe it is necessary that we not only strive to understand technical details of an EAM work, but also find a framework in which we can examine the extent to which such details conform to (or resist) a larger grammatical structure. We, then, will be able to develop a way to describe the consequent dialectical tension between the whole and its particular elements.

Fred Lerdahl articulates different types of musical grammar in his "Cognitive Constraints on Compositional Sys-

tems." There he defines compositional grammar as "a limited set of rules that can generate indefinitely large sets of musical events and/or their structural descriptions" [7], and then distinguishes *natural* compositional grammars from *artificial* compositional grammars. While the latter can be consciously developed by an individual or a group, a natural grammar organically arises from shared norms within a certain cultural boundary. In Adorno's aesthetic theory, it is a natural grammar that serves as the socio-historical essence or collective compositional tendencies inherent in mediated musical material, which is lacking for EAM, in part due to its historically short lifespan as well as its culturally diverse origins.

This is precisely what makes a representative *constellation* of EAM works so challenging to capture—despite the prolific creation of EAM works to date. It is extremely difficult to manually sort out the sheer amount of data related to a collection of EAM works and to identify the socio-historical context from which a piece emerges. But it is also the reason why a unified understanding, model or grammar for EAM analysis is needed. For without it, the process of composition, critical listening and the ongoing evolution and progress of EAM music seems theoretically and aesthetically barren.

While we are far from ready to offer a comprehensive plan for resolving this challenge, we propose a practical and integrative approach that could contribute in resolving it: the development of a dynamic and crowd-sourced EAM exploration project called the Electro-Acoustic Music Mine (EAMM).

4. ELECTRO-ACOUSTIC MUSIC MINE

EAMM is an EAM-archival hub system [8] being developed in collaboration with the international computer music association (ICMA), the New York Electro-Acoustic Music Society (NYCEMS), and the NYU Library. It consists of three large modules: (1) a filtered-crowd-sourcing music collection module, (2) an EAM archival module, and (3) an EAM visualization and exploration module. Its development (since 2011) reflects the confluence of big data science, cloud-computing technologies, and crowd-sourcing paradigms that will allow for the effective collection and processing of the huge amount of EAM data and works that continue to be produced for conferences like this alone.

In the initial stage of crowd-sourced-collection of EAM works, we are inviting organizers of EAM conferences and festivals to take advantage of EAMM's Conference Management System (CMS). The custom CMS is a heavily modified rendition of the Open Conference System of Public Knowledge Project[2] for the purpose of better serving the necessities for collecting, judging, and archiving EAM pieces. If an artist/composer opts to participate in archiving

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[2] https://pkp.sfu.ca/ocs/

his or her work, and the work is accepted by the conference, the artist/composer then takes responsibility to provide authorial metadata and media data. A camera-ready archival submission can include scans of handwritten compositional notes, computer code and various media files, detailed documentation of technical setup, and any other relevant information that directly or indirectly constitutes the piece. To prevent the EAM metadata from being constrained by the traditional music archiving format, we have tried to construct an extensive list of metadata categories to reflect the current diversity of EAM, but have also allowed for self-designated categories and individualized additional comments to expand the list where appropriate. We hope that such meticulous and exhaustive documentation will help preserve the socio-historic essence of each individual piece. Although we are just beginning to crowd-source EAM data, the 2014 NYCEMF festival had a 95% EAMM participation rate comprising 400-plus works.

Another main EAMM feature is the ease-of-access to the collection of historical and contemporary EAM works. If we are to take Adorno's assumption that there is no such thing as aesthetic invariance, a constant offering of alternative interpretative possibilities is an absolute necessity for anything *new* to be possible. Accordingly, we are developing a variety of interfaces and visualizations to access, summarize, and display the collected data. For instance, our current "hoverer" feature [9] can treat a "sound event" within a piece [6] as a single object—visually represented as a single point—by summarizing its timbral characteristics, while also projecting myriad sound events to a user-defined number of timbral dimensions. The prototype interface allows one to sonically explore by "hovering" across a musical space populated by "sound pixels."

It should be noted, however, that EAMM is not a music analysis tool, per se. Rather, it assists in EAM analysis in that it automatically extracts quantitative sonic features via MIR techniques and presents them via visualizations that reflect measurable information enabled. Furthermore, by providing annotation-and-tagging interfaces, EAMM allows one to collect and share points of view of other musicians.

Essentially, the ultimate goal of EAMM is to help scholars theorize and formulate a convincing musical context when interpreting a piece of EAM, and perhaps even foster a model akin to the Adornian three-step analytical process of technical analysis, sociological critique, and philosophical interpretation. If a process of finding a proper set of musical norms to constructively interpret a particular piece of EAM is found to be successful, steps are then truly being taken toward discovery of a "natural compositional grammar" (as introduced in Section 2) that leads to an understanding of the piece as a dynamic socio-historical process.

Once we create a sizeable database of EAM works via EAMM filtered crowd-sourcing mechanisms (conferences, festivals, and concerts), the potential for developing a global collective whose members can engage in an ongoing dialogue and critique of EAM works may be realizable. This may further lead to the development of a constellation of EAM works through our own dialectic process of collective understanding.

5. CONCLUSIONS

We employed an Adornian philosophy of social and artistic advancement for EAM analysis as it offered a framework for discussing its extreme socio-historical musical diversity and its lack of a common, unified model/grammar to help in its analysis beyond discussion of technical dimensions. We found Adorno's three step analytical methodology of music analysis, sociological critique and philosophical interpretation suggestive of an approach and discussed how the collaborative EAMM project could potentially address the first step. We are hopeful that EAMM can contribute in capturing the notion of constellational EAM works—including audio files, scores, computer code, EAM meta-data, technical performance details, and user annotations/labels—that are needed for establishing a useful natural grammar that accommodates the diverse socio-historical backgrounds of EAM and allows for its better analysis and greater appreciation.

6. REFERENCES

[1] T. W. Adorno, *Aesthetic Theory*. New York: Continuum, 1997.

[2] M. Paddison, *Adorno's Aesthetics of Music*. New York: Cambridge University Press, 1993.

[3] T. W. Adorno, "The Aging of the New Music," *Adorno: Essays on Music*. Los Angeles: University of California Press, Ltd., pp. 181-202, 2002.

[4] T. W. Adorno, "On the Problem of Musical Analysis," *Adorno: Essays on Music*. Los Angeles: University of California Press, Ltd., pp. 162-180, 2002.

[5] T. H. Park, Z. Li, and W. Wu, "EASY Does It: The Electro-Acoustic Music Analysis Toolbox," in *International Society for Music Information Retrieval Conference (ISMIR)*, 2009.

[6] T. H. Park, D. Hyman, P. Leonard, and P. Hermans, "Towards a Comprehensive Framework for Electro-Acoustic Music Analysis," in *International Computer Music Conference Proceedings (ICMC)*, 2011.

[7] F. Lerdahl, "Cognitive Constraints on Compositional Systems," *Contemporary Music Review*, vol. 6, no. 2, pp. 97-121, 1992.

[8] T. H. Park, B. Miller, A. Marse, and J. Turner, "The Electro-Acoustic Music Mine (EAMM)," in *Electroacoustic Music Studies Network Proceedings (EMS)*, 2012.

[9] T. H. Park, J. H. Lee, J. You, M. J. Yoo, and J. Turner, "Towards Soundscape Information Retrieval (SIR)," in *International Computer Music Conference Proceedings (ICMC)*, 2014.