Dhvāni: Sacred Sounds and Decolonial Machines

ABSTRACT

This paper provides an entry into a decolonial approach to AI driven music and sound arts by describing an ongoing artistic research project Dhvāni. The project is a series of responsive, self-regulating, and autonomous installations driven by Artificial Intelligence and Machine Learning and incorporating ritual and sacred sounds from South Asia. Such mélange re-emphasizes and advocates for the values of interconnectivity, codependence, network, and community with a decolonial approach. By giving the AI an autonomous agency, the project aims to reimagine the future of AI with an inter-subjective reciprocity in human-machine assemblages transcending the technologically deterministic approach to AI-driven live art, media arts and music. Through unpacking the project, this paper underscores the necessity to dehegemonize the AI-driven music field towards a transcultural exchange, thereby transcend the field's Eurocentric bias.

Author Keywords

AI, Sound Arts, Global Souths, Decoloniality, Frugality, Pre-modern, Participation, Community, Network theory, Co-listening, South Asia

CCS Concepts

Sound and music computing; Performing arts

1. INTRODUCTION

Dhvāni is a series of responsive, self-regulating, and autonomous sound installations driven by an Artificial Intelligence with an indigenous approach to Machine Learning. The ongoing project incorporates ritual and sacred sounds from South Asia. Such mélange re-emphasizes and advocates for the values of interconnectivity, codependence, network and community with a decolonial approach. By giving the AI an autonomous agency, the project aims to reimagine the future of AI with an intersubjective reciprocity in human-machine assemblages transcending the technologically deterministic approach to AI-driven live art, media arts and music. In this paper, I aim to describe the conceptualization and processes of the work-in-progress to shed light on the discourses on frugality and innovation, pre-modern sound technologies and decoloniality.

2. CONTEXT: PRE-MODERN SOUNDS

A pluck of the strings in the lower registers of the Rudraveena or the Tanpura produces sounds that are as plurivocal and multi-harmonic as the sounds of natural phenomena, such as thunder or rains, or heavy wind through the fields, representing a textural complexity and sonic saturation that are grounded and embedded in nature. The resonant grains in the sounds from the strings of these pre-modern instruments are often deemed desirable in traditional sound performances like Dhrupad and Khayal, to provide a situated and grounded sound, as close to natural temporality and spatiality as possible. I have shown in my earlier research [1] how Ragas are reflections of natural temporalities: each Raga dedicated to a time of the day; for instance, Darbari is for midnight, and Bhairavi for early morning. The court music and devotional music-oriented instruments such as Surbahar and Nadaswaram are accommodative of intricate and often complex

tonal formations. The outdoor and communal instruments like Ektara or a folk percussion instrument like Madal are also meticulously designed to produce sounds close to the ground. As sound-producing technologies and machines, these instruments have gone through innovative design developments and tunings as musicologists like Alain Daniélou have suggested (1995) [2]. As situated technologies, these instruments explicitly use natural materials. The Rudraveena's body is a tube made of bamboo or teak trunk attached to two large tumba resonators made from gourds. These pre-colonial, pre-modern sound-producing instruments and interfaces were conceived of and built in South Asia using indigenous technologies and pre-modern methods, in ways that destabilized the nature-society binary, contrary to the methods of European modernity. French philosopher Bruno Latour has argued (1993) [3] that pre-modern communities made no distinctions between nature and society, while Western modernity was based on this exploitative dualism.

In the seminal treatise Natyashastra (c. 200 BC – 200 AD) [4], Indian aesthetician Bharata discusses the uses of various sound instruments, proposing a four-fold classification of these sound-reproduction systems: tat (strings), ghan (solid), sushir (winds), and avanaddh (covered membrane). This was a systematic attempt to taxonomise sound technologies based on the type of sound-producing material, such as strings, solid body, air column, or stretched membrane, which are made to vibrate using different techniques of interfacing such as plucking, blowing, bowing, and striking. In the 1920s, the Indian physicist Dr. C. V. Raman conducted research to uncover the unique acoustic properties of Indian string and percussion instruments and the intricate technological innovations behind making them. Raman scientifically proved that the materials and techniques used in making as well as performing on these instruments result in microtonal and timbral qualities that are unique and not found in the musical instruments of the West. The custom-made curvatures of the bridge that supports the strings, and the tensile, vibrating membrane in percussive instruments like the Madal, the Dholak, and the Dhak were significant technological contributions that India made to the world of sounds. Contemporary Music Retrieval System scholars, such as Matthias Demoucron, Stephanie Weisser, and Marc Leman identify how Indian traditional sound-producing instruments are characterised by the presence of the sympathetic multiple string clusters called taraf and the curved wide bridge called jawari (often reinforced by a cotton thread), underlining the ways in which these intricate and sophisticated innovations make the sounds of Indian traditional music uniquely complex, embedded in nature, and grounded in the philosophy of multiplicity [5]. They are beyond the analytical comprehension of today's simpler computational algorithms based on Western equal-temperament tuning systems. This knowledge ecosystem was transmitted orally from generations to generations resulting, in multiple schools of thought and performative interpretations, and yielding agency for the many performers, musicians, and artists.

However, such non-Western sound technologies and embedded practices were often deemed "primitive," and termed "indigenous" in the same vein as "pre-modern," by the dominant Eurocentric sound and music culture that bore the colonial perspective of a provincial sense of superiority. Media scholar Marshal McLuhan's seminal admission of oral systems as "primitive" is one such reflection of this colonial attitude [6]. The invocation of the pre-modern as an inadequately developed opposition to the modern, however, is widely condemned today as European modernity's representation of its Other.

Scholars like David Mosse and Esha Shah have shown how the currency ascribed to the idea of the pre-modern (or what is otherwise loosely termed "traditional", "primitive", or "indigenous") is not only founded on a binary opposition with the modern but also embedded in particular strategies of imagining a pre-colonial "primeval" past and the lived globalised present from a Eurocentric perspective, and therefore, putting in place a power structure in which modern technologies are posed as superior and capable of saving the world [7] [8]. These colonially positioned perceptions and views are far from being historically accurate. The usage of the prefix "pre-" before "modern" should not suggest that modernity starts from a distinct temporal point and that everything prior was primitive: this, in fact, is a grossly colonial perspective that upholds Western dominance and supremacy. South Asia, particularly the Indian subcontinent, housed sophisticated sound technologies in their own right, which is evident in pre-modern musical instruments such as the Rudraveena, the Surbahar, Nadaswaram, and Yaazh, among others, the tuning systems of the temple bells, North-East Indian wind chimes, and performative sonic accompaniments like Ghunghroo. All of these, and so many more, embody the handling of complex sonorities with innovative instrument design and tunings explored in the Dhvāni project.

Given a more egalitarian and equitable shift in the medial perspective now, one may ponder upon the archaeology of what is commonly understood as "technology" – which is often a Western concept of linear progression, and, in essence, instrumentalised as a colonial tool of surveillance, and plunder. Indeed, if we take a historical perspective, in South Asia, the transfer and transmission of modern technologies took place as a colonialist and imperialist strategy of control, that would enable the exploitative inventorisation and governance of local resources. In India, the advent of such technological manifestations, such as railways and factories, happened through colonial models of development and profit-making that went on to primarily benefit the Raj. Western media technologies, such as recording, photography, radio, and cinema, all contributed to these administrative systems. It was only the colonial subjects who gradually hacked into these technologies and reclaimed them to produce new hybrid kinds of aesthetic practices. Of course, the Global North's condescending approach towards the colonised South didn't allow for an equal distribution of power, knowledge, and aesthetic understanding. That is why pre-modern sonic practices from India, like many such rich practices outside of Europe, are not considered part of the canon in the process of making a taxonomy of what is termed "tech arts", "media arts" or "sound art" in the West. However, India has been home to some of the oldest and most time-tested technologies and practices in the visual, literary, and sonic realms, as well as in urban design, water management, and agriculture. There would be no justification for a hierarchy of knowledge systems and cultures if we listened to pre-modern and pre-colonial aesthetic practices where a pre-modernisation concept of technology existed with a grounded, community-driven and embedded vision, which was as intricate as its global counterparts, though largely ignored in Western histories of science and technology. Musical instruments are some of the most prominent examples of these technological innovations. If we unpack the dexterity with which sound-producing instruments were built in India using home-grown technologies of tuning and design, we will find that pre-modern technologies and sonic practices were as sophisticated as the technology we know today from a Western colonialist standpoint. Therefore, it makes no sense to adhere to the hierarchy of "high tech" and "low tech" which conflates the pre-modern with the primitive and to define creative practices only from a Western taxonomy of sound and media arts. Given these historical examples of artistic practices and innovations from India's pre-modern past, sound art needs to be redefined with an aim to decolonise sonic practices, giving due credit to artists and artisans from Global Souths.

3. CONTENT

3.1 Work-in-Progress: Dhvāni

Dhvāni is a series of responsive, self-regulating, and autonomous installations driven by Artificial Intelligence and Machine Learning and incorporating ritual and sacred sounds from South Asia, such as temple bells, traditional windchimes, Ghunghroo, Gong among others. Such mélange re-emphasizes and advocates for the values of interconnectivity, codependence, network and community with a decolonial approach. By giving the AI an autonomous agency, the project aims to reimagine the future of AI with an intersubjective reciprocity in human-machine assemblages transcending the technologically deterministic approach to AI-driven live art, sonic media arts and music.

Dhvāni incorporates ritual and traditional practices from South Asia, to bring new perspectives into interactive media arts. The project emerges from the artistic research for a re-listening to and re-telling of South Asia's listening cultures to the world in the contemporary moment of crisis, informing the AI-driven surveillance and controlled societies of today about the values of interconnectivity, community and reciprocal ways of life, often found in the ritual practices of the Global Souths. The work aims to envision a geological equity, rendering the linear curves of Western-modernity-dominated sense of temporality a cyclical one by refocusing on memory, rituals, and redefining the local and traditional arts, and the indigenous cultural practices. This temporal mélange may help in finding answers to the crises of today, such as climate breakdown, and global inequality. Dhvāni in its exhibition aims to create fertile, evolving and autonomous situations, which are relational, performative, and radically participatory, whereby the subjectivity of the audience are considered in an inclusive manner to encourage a reciprocal approach in a shared artistic experience through a network of traditional objects, such as temple bells or indigenous wind chimes. As method, Dhvāni incorporates Artificial Intelligence and Deep Learning, building a neural-like network of sacred sounds in which various sizes and tunings are incorporated to creating a collective sounding that responds to the presence of the audience through ambient sound sensors and activated with a number of robotic arms driven by the AI. A pre-prototypical pilot installation from the project was exhibited and tested successfully at Experimenta Biennale Arts Sciences 2020, in which a frugally made robotic arm pulled a small, interconnected bell system driven by a Pure Data patch. From this pilot version supported by Google Artist and Machine Intelligence grant and AI Lab (EU), a full-fledged installation with 4 arms was developed under further funding support from Creative Industries Fonds, The Netherlands, exhibited at the Rewire Festival 2021 curated by iii, Den Haag, and later exhibited at the Apparao Galleries Chennai in 2022 with two other editions. The advanced version of the project will be exhibited at ISEA2023.

3.2 Method: Decolonial Machine Learning

Dhvāni contributes to Connecting Resonances - an artistic research dedicated to decolonize the fields of technology-driven arts by bringing into the foreground non-Western and pre-modern ritual and traditional art practices, and facilitating their direct interaction with a predominantly Western-modernist realm of Artificial Intelligence and Machine Learning [9]. The aim of the project is to investigate how the ritual and traditional arts that are based on pre-modern and pre-colonial times might be able to engage productively with the automation and self-regulating agency of the AI to generate new forms of art, and

new, decolonial knowledge in the field. By facilitating this bridging between past and present, Global Norths and Souths, sacred sounds and technology, the project intends to questions:

1.How can a focus on artistic process over product inform the future of AI as a decolonial approach of inter-subjectivity to human-machine interaction, in science, technology, and society?
2.How can a practice of critical making inform the field of AI in the arts and music?
3.How can improvisation and performativity, as curated datasets or theoretical frame, help shape AI's future possibilities in both capacity and applications?
4.How can the traditional arts help to destabilize techno-cultural power alignments, and enables the field of AI address and shape a more sustainable and inclusive human-AI interaction, assemblages and co-dependence?

The artistic research aims to give shape to a series of self-regulating and autonomous installations driven by state-of-the-arts AI tools and Machine Learning models, while incorporating ritual elements, sacred and traditional artistic practices with sound and listening from South Asia, such as, as mentioned earlier, temple bells, Buddhist Gongs, wind chimes, Ghunghroo and Dhak or Dholak, as points of technological convergence.

4. CONCLUDING REMARKS

Dhvāni, meaning resonance in Sanskrit, is an AI-driven interactive, responsive and self-regulating sound installation that revolves around the idea of the Network, community, participation, and inter-connectivity. The work is based on current research and development in Machine Learning (Deep Learning, audio classification), and brings the knowledge to interactive art in the form of emergence, indeterminacy and chance drawing perspectives from South Asian thought traditions on these issues. At its core the project draws on ideas of selfhood, inter-subjectivity and reciprocity to shed light on questions of agency, autonomy and a poetic human-machine assemblage. The work is part of a large-scale artistic research project that aims to create an interest and cultivate new knowledge in Non-Western ontologies and epistemologies (disrupting a predominantly Western-modernist and Eurocentric context of canonizing knowledge in the arts), decolonization of art history, as well as studies of globalization and cultural exchanges between the West/Global North and its ignored counterparts in the Global South, advocating for reciprocity and equality, imagination and poetics in the technology-driven artistic practice. Taking a South Asian epistemology-informed approach to sound and transcendental listening, the work underscores the role of the listener, inter-subjectivity and situational context of the audience for construing an artistic experience and examines the role of the "self" against an overarching emphasis on artistic object embraced in the Western art traditions. Departing from the object of consumption, Dhvāni in its exhibition aims to create fertile, evolving and autonomous situations which are performative, relational, and radically participatory, whereby the subjectivity of the audience can be considered in an inclusive manner to encourage a reciprocal approach in a shared artistic production. This shift in perspective and approach towards contingency and new temporalities helps develop an understanding of the role of chance and indeterminacy in artistic experience. This alien agency is addressed by creating temporal disjuncture for a "divine intervention" as Indian musician Gita Sarabhai informed John Cage in 1946 helping to shape Cage's subsequent work with chance composition [10] based on his borrowing of ideas from

Asia and underlining a curious sonic confluence. The aim of the project is to reflect on the idea of inter-connectivity and codependence in contemporary world marred by a pandemic, climate catastrophe, and racial conflicts. Showcasing the work in progress and its methodologies in the context of NIME2023 will not only help broaden the field of frugality and poetic exploration of technologies like AI in the field of music and sound arts, but also enrich and consolidate the conceptual, contextual and technological framework of the project receiving responses from peers to spark a pertinent discourse in the field.

5. FIGURES/CAPTIONS
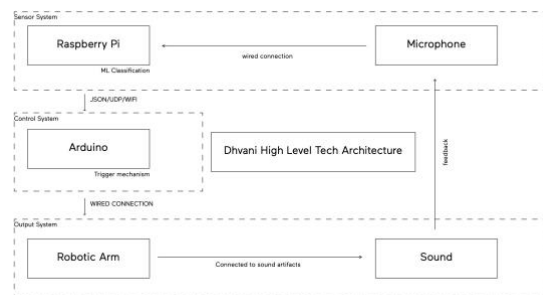
6. ACKNOWLEDGMENTS

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8. Appendices may follow the references

Sound/video examples: https://vimeo.com/668208855