

# Polymer Dub: Urban soundscapes, evolution and cultural values

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**Abstract.** We propose and describe a real-time musical performance traversing the boundaries between technological expression and the analogies, paradoxes and construction structures between, generative music, evolution and dub music performance. Dub music was born out of technological advances and sociological changes. We analyze its development, influence in modern music and propose its continued evolution using intelligent agents as a follow up of its aesthetic characteristics, and nature. Blocks of glitch, techno, field recordings and dub elements portray a soundscape of a city, culture and its acoustic elaboration.

**Keywords:** Generative music, dub music, perception and cognition, performance mixing, audio engineer, techno music, machine learning.

## Description

The technology was responsible for the birth and continued evolution of dub music, and it is one of the most innovative and prominent recording and performance techniques of modern music. Dub is a genre and a process created as a means to maintain currency and relevance (Howard, 2008; Sullivan, 2014). According to Nils Frahm, Dub is influential for all kinds of musicians and is almost as important as classical or jazz music. Jazz is the main language of improvised music, classical is the primary language of notated music, and dub is the language of engineers. Dub transformed the engineer into an artist (Kane, 2014).

It is hard to overstate the impact dub has had on contemporary music production. It is an unquestionable accomplishment, has been celebrated in academic circles for some time now, and it has infected pivotal music movements from post-punk and industrial through to boogie, house, jungle and trip-hop (Howard, 2008; Warwick, 2018). It is also hard to overstate the influence of socio-economic developments in dub producers. They employ compositional techniques that carry social or political messages, embedding their sound into a very particular real-world context. The methods developed by these composers reveal awareness of environmental context, highlighting the relationship between the human and the environment, focusing on real-world context, rather than just technological experimentation (Yoganathan, 2018).

Dub, as a contemporary musical subgenre manifests a sense of futuristic melancholia that incorporates urban soundscapes into electronic dub rhythms (Kolioulis 2015). In “Borderlands: Dub Techno’s Hauntological Politics of Acoustic Ecology”, Kolioulis argues and documents the aesthetic relationship between dub techno soundscapes, the urban environment in which they proliferate and the socio-economic aspects that surround dub techno evolution and production. The author analyzes the conditions for dub techno’s artificial suspension as a sign of hybrid nostalgia toward the future and how it resonates in digitized environments. He also reflects on the aesthetic relations between dub techno soundscapes and urban space. Hence the importance of considering socio-economic aspects that surround the development and future evolution of dub music.

The evolution of dub music always portrays an intrinsic element of current technology. From being the first genre to use a mixing board as an instrument, using some of the first drum machines, opening platforms for “toasters”, taking advantages from digital tools to creating contemporary and experimental forms.

## **Aesthetics and influences**

In the past, music was spread through radio and sound systems. Now it is promoted over the Internet and recommender systems using intelligent agents. The inclusion of intelligent agents seems to be the next step in the evolution of dub, now that technology is part of the artistic preoccupation in the futuristic vision of dub techno. This inclusion will create a new aesthetic as explored by Lee (2019), where the author suggests that the use of intelligence, specifically machine learning, will reveal uncertainties that leverage the value of working with machines and technology. In lack of traditional criteria by which to adequately judge the products of machine learning, uncertainty creates a new conceptual approach to aesthetic qualities of artefacts produced using intelligent agents.

Technology is involved in this piece as a source of confidence and assistantship during the performance. It integrates a level of entropy, which, according to Daikoku (2019), is associated with surprise and meaning in the outcome. Inspiration is complemented with influences from sources such as technological developments in music production and performance thanks to musical practices and techniques originating from Jamaican music as well as audio engineering, in addition, the use of natural and contrasting artificial sounds, together with the parallelism among scientific and social changes involving and influencing music creation.

In the search for the truth, humans have the curiosity and the impulse to explore the natural world. Chemists investigate in terms of atoms, molecules and chemical reactions. Musicians investigate in terms of notes, sounds, or sequences of elements. They both use fundamental units as building blocks, they both have meaningful time dimensions, and both express its process in the language of mathematics (Kumbar, 2007).

The ability to record and modify organized sound is power over the sound; it is the use of technology towards control of space and time. Controlling sound independent of its creation and creator is, therefore, a profound political act (Jones, 1989). This act involves technological changes and processes such as the market structure to commercialize it, as well as the space that allows the emergence of new music cultures from social and cultural change. Frith (1987), describes this phenomenon as popular music’s process of industrialization and marketing. The intensification in the use of technology and science is a firm characteristic of neoliberalism.

The birth and evolution of polymer technology represent an accurate analogy with the development and performance of dub music. With a marked enrollment of science into the process of production and industrialization of a chemical process, the design and manufacturing of materials made of polymers require a considerable piece of knowledge and science, as well as its final application and use, just like music production and performance.

Referencing and finding analogies of the structure, composition and performance of a music piece to a chemical process gives this piece a firm reference to industrialized physical phenomena occurring in the real world.

## **Structure and composition**

Music is a reflection of social and cultural preferences and is capable of creating emotions (Febres, 2017). These preferences use a series of interacting components whose knowledge allows them to generate new sequences from original phrases. This piece is composed using repeated patterns or

building blocks of music, which can be simple or more complicated structures (such as polymer materials). In performance, we traverse the construction and composition of polymer materials to apply it to dub music performance, building around a skeleton structure. The essential elements of dub are the drums and the bass, which for us, represent the skeleton of our composition. We employ the concept of using the mixing board as an instrument to perform in the style of dub music using a computer and a MIDI controller. The performance contains elements and sources of uncertainty provoked by the performer in conjunction with algorithmic composition features provided by intelligent agents influencing musical sequences and parameters on a digital mixing board inside a DAW software.

Markov Chain is a stochastic model used in modelling the components of music composition. It encodes music compositions and is one of the most popular strategies for algorithmic music composition. Music is seen as a sequence of symbols and is generated probabilistically by assigning conditional probabilities on those symbols given the preceding ones. Meyer (1956) postulated that meaning in music is directly related to entropy. A high degree of entropy or uncertainty engenders greater subjective tension, which correlates with more meaningful musical events. Music carries meaning by associations to non-musical things such as stories, visual imagery, environmental sounds, symbols, and lyrics. The use of this technique produces a performance characterized by a temporal structure in music, which, in this piece, is not entirely defined. The final composition, parameter manipulation and structure are a product of the performers' decisions and generative models during the performance. A range of activities such as modulation or controlled gestures for each performing element is delimited, to avoid characteristics of random music or other forms of improvisation and to keep the original intention of the composition.

The sound in this piece is dry, minimalistic, precise and robotic, softened with echoes, a wall of sound and field recordings. Drums and bass are deep and percussive, creating a contrast with the rest of the composition and remains at the heart of the performance. In this aspect, Polymer Dub adds new layers and dimensions to early and classic dub techno tracks, which avoided any sense of anticipation (Demers, 2010). The use of generative processes with Markov Chains on the performance creates a higher grade of entropy and hence, surprise and interest (Meyer, 1956; Cox, 2010). It contrasts with the steadiness of wall of sound soundscapes, which avoid development through repetition in an alternate sense of time, as Kramer, (1981) calls this sounds "vertical time". The contrast of vertical time and surprise refers to what Kolioulis (2015) defines as techno existentialism, in an expression of standing against the pressures of urban life with a deep sense of melancholia. By representing aesthetic relationships between the soundscape of a city and its acoustic elaboration in an artistic effort to reproduce the dynamic ecology of a city.

## Media Assets

This section presents links to previous recordings of the performance described in this proposal.



**Fig. 1.** Polymer Dub at Barcelona by SAE Institute.  
(<https://youtu.be/u8kY-aYkvHE?t=329>)



**Fig. 2.** Polymer Dub at Mexico City by Centro Cultural España.  
([https://www.youtube.com/watch?v=3S\\_LI9ljG8Q](https://www.youtube.com/watch?v=3S_LI9ljG8Q))

## Conclusions and future work

This piece looks out to reflect on the outcome of a creative process traditionally related to technology with the use of intelligent agents while weighting the long-established artistic idea of finding beauty and meaning in music. Also, embodying current socio-economic and cultural values influencing its outcome as well as the continued and natural evolution of dub music.

This performance exhibits an adaptation of the live performance and generative composition technique Markov Chains. The setup produces pleasing but imperfect and unexpected compositions in a real-time improvisation, representing a man-machine interaction in harmony, building on the idea of using the mixing board and the studio as an instrument. The application of new trends in technology implicitly follows what Beckford (2006) has studied and proposed as culture dub itself when reworking and remixing culture for the sake of engendering and emancipation.

The use of technology, in which dub music performance is based, as well as the computerization of manufacturing, depicts a new mode of production, in both fields, industrial and musical. Development of these practices happened in parallel during the reordering of the global political economy over the past 40 years. The industrial shift produced in the creative and economic scopes gave birth to knowledge-based high-technology industries, including the polymer industry. Because of this, the whole movement created a change in the traditional notion of citizenship, away from collective, class-based solidarities and towards radical, transcendent individualism characterized by the informational neoliberalism. This way of thinking has become both the dominant mode of social understanding and a blueprint for a future utopia (Neubauer, 2011). The evolution of the social environment has impacted dub producers in their sound and aesthetics (Kolioulis, 2015), and it is an interesting field of study each time a new technological or social change appears.

We briefly discussed the similarities and parallelism between technological evolution and a musical subgenre that has always relied on technology and has been heavily influenced by socio-cultural aspects, representing them in its sound and aesthetic. We analyzed current trends in technology for musical expression and suggested the new direction and sound it could present in the future. However, we are interested in measuring its impact and aesthetic value. We want to expand this idea to the current community of dub producers to elaborate further on this concept, possibly in future research.

The development of this piece proposes another interesting observation in the application of learning technologies to tasks usually performed by humans. The use of computers as a vehicle to gain insights into human cognition, intelligence and learning. Specifically, whether the current state of machine learning explains the mechanics of human learning, as proposed by Kao (2018), who explores the differences in human and machine learning in complex strategic environments. In the case of dub mixing and performing, intelligent agents can help us control the high amount of

parameters available, and humans with developed listening skills, a better understanding of musical styles and insights of musical cultures, can make higher-level performance decisions.

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## **Tech Rider**

1 Stage table or desktop for the performer of at least 2m2 area, for computer, notebook and MIDI controller.

4 Power connections for a computer.

1 Stereo P.A. Sound System.

2 RCA or TSR output to the main mixer.

2 Stereo sound monitors of at least 10 inches no farther than 3 meters from the desktop.

## **Setup Details**

Setup time: 30 minutes.

Soundcheck: 30 minutes.

Only the performer will be involved in this task.