# COMPLEX: PHYSICAL RE-SONIFICATION OF URBAN NOISE

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## ABSTRACT

This paper explores the aesthetic and social values of the noises of modern urban soundscapes and discusses some strategies for boosting the accessibility and appreciation of works of sound art and experimental music that employ them. A proposed audiovisual installation—entitled *complex*—is outlined as a practical application of techniques designed to reveal the sonic aesthetics of urban technological noise, primarily through re-sonification and visualization. This will be achieved sonically and physically, by mapping sonic data collected from New York City soundscape (using the *Citygram* project) onto custom-designed mechatronic soundsculptures.

## 1. INTRODUCTION

Along with the exponential rate of developments in urban technological life since the industrial revolution, their sonic artifacts have grown in quantity and variety. For more than a century, city life has involved immersion in a constant cacophony of machine noises. While it may be true that noises of the urban technological life are not made to create musical pleasure, does that necessarily mean that they *cannot* be of potential aesthetic value?

Criticizing aesthetics theory's lack of attention to nonmusical sounds of the environment, Fisher suggests that this negligence "in part reflects the fact that modern urban dwellers often ignore or suppress awareness of many of the sounds around them" [1]. Such sounds are unwanted aural artifacts of those technologies and urban inhabitants learn to ignore them. However, as Fisher argues, "just because nonmusical sounds are not intentionally produced to be pleasing to listen to, it does not follow that they are not pleasing to listen to" [1].

## 2. NOISE: UNWANTED OR ACCESSIBLE

A century after Russolo's *Art of* Noises [2], his idea of using noises of urban life in a musical context by regulating them harmonically and rhythmically can be traced to modern glitch

and noise music. Here, the noises of modern technologies, in a digital form, are often sampled, manipulated, and presented via a frame of pulses and rhythmic patterns [3]. Indeed, the appreciation of such new sounds has been core to the creation and reception of an extensive number of works of contemporary art and experimental music. However, as Landy points out, a great deal of such works are "of marginal relevance to today's society in terms of its appreciation" [4]. According to him, this is a "side effect of the 'art for art's sake' movement" whose consequence was the separation of art from life. Landy argues that in order for the contemporary works of experimental music and sound art to be appreciated by an audience broader than just peer musicians and artists, certain aesthetic "access tools" can be used. These access tools can provide the audience with what he calls the "something to hold onto" factor, and are intended to increase accessibility and appreciation. Landy suggests a number of parameters that could be utilized as access tools, including the use of conventional (pulsed and metric) rhythms. Additionally, he highlights the strong effect of the visual aspects of sound-based works in boosting accessibility:

> … inexperienced listeners tend to find sound-based works more accessible when introduced in a convincing manner within *audiovisual contexts* regardless of what they are [4, emphasis added].

## 3. COMPLEX: AN AUDIOVISUAL INSTALLATION

Embracing Landy's idea of accessibility, *complex* is an audiovisual installation proposed to enhance awareness and appreciation of the ignored audiovisual phenomena characterizing our daily urban lives. This will be achieved by deploying two of the "something to hold onto" factors discussed in the previous section: pulse-based rhythms and visual accompaniment.

The work involves mechatronic soundsculptures, entitled Rasper, that appropriate everyday objects from urban technological life, shifting the context in which they normally exist, and formalizing them through pulse-based rhythmic patterns. In these instruments, DC motors and electromechanical actuators are detached from the everyday realm in which they are audible, but invisible components of our technological environment—where their noise is merely an aural byproduct—

and turned into a medium for sonic expression. In contrast to their withdrawn location inside machines, their bodily existence is fully exposed in *complex*, drawing attention to the physicality of their noise-making. This physicality is further highlighted in arrays of white light which—unlike the florescent lights of the daily urban life—are not there to help us see things, but to be seen themselves.

### 3.1. The Instrument: Rasper

Rasper is a mechatronic noise-intoner in which mechatronics and microcontroller programming are used to create rhythmically-ordered noise. The noise (rasping) is generated mechanically and the noise-production apparatus is visible and accompanied by further visual feedback provided by an LED strip reminiscent of florescent tubes. Rasper brings the ignored and unwanted noises of the machine to aural attention, by regulating their irregularity (or noisiness) through a rhythmic grid of pulses and metric rhythms, thereby musicalizing them, while also highlighting their physicality [5].

### 3.2. The Input Source: *Citygram*

Rasper receives MIDI messages as input. Therefore, any stream of data that can be converted into MIDI messages could drive the instrument. With this in mind and in order to achieve conceptual cohesion, the *Citygram* project [6] was chosen as the source of input data. *Citygram* is a project in which data from the acoustic energies of the urban environments are collected, visualized, and mapped. At the current stage, *Citygram*'s focus is on the data from a limited number of small and manageable spaces, including a few blocks in Manhattan.
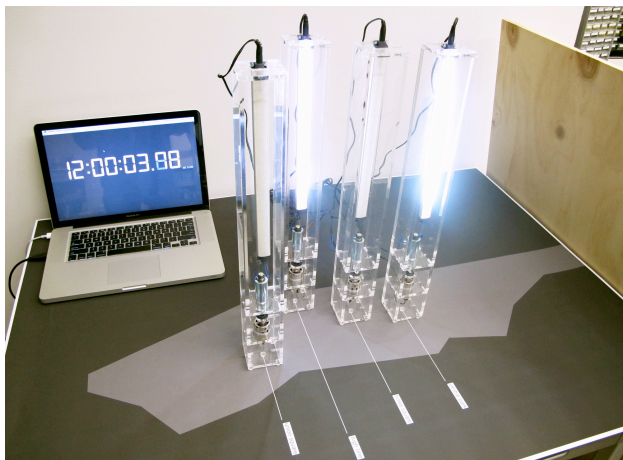
### 3.3. Realization



**Figure 1. *complex*: Demo setup using four units of Rasper**

As shown in Figure 1, the installation will employ a set of four Raspers, playing interlocking patterns that are fed from the *Citygram* database. Four symbolic locations in New York City (Union Square, High Line Park, Times Square, and Central Park) were chosen as the input source for each Rasper. Data

from these locations is mapped onto instruments according to the following criteria: RMS values extracted from the audio feature vectors will be scaled from 0 to 127, converted to MIDI velocity values, and, if higher than a certain threshold, will trigger the instrument. Calling the sequential input data and outputting the MIDI values will be delayed by 100 milliseconds in every cycle in order to reach a more accessible sense of rhythm. The sequence will restart after cycling through 44,444 entities of all datasets synchronously. During each cycle, entities' timestamps will be screened on a monitor after being converted to the standard date and time (see Figure 2).
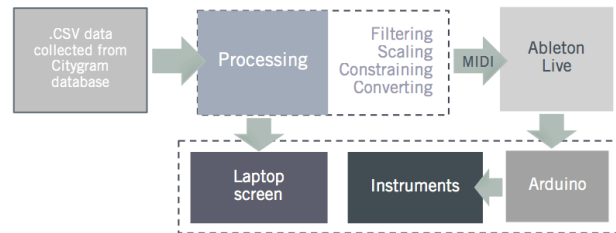


**Figure 2. System Overview**

### 4. CONCLUSION

Rasper and *Citygram* can be understood as sharing a perspective on sound and the soundscape. Firstly, they focus on noises of the urban soundscape and draw attention to aural phenomena that are normally ignored by the ears of city dwellers: the ubiquitous buzzing of the urban machines, or the incessant clamor of New York City. Secondly, they employ strong visual accompaniments, so as to create unified audiovisual paradigms in which the worldly existence of noise is highlighted in a way that is both accessible and engaging. In this way, *complex*, as a compound of both, reasserts the audiovisual noise of the urban life, underscoring its existence and affirming the need for awareness of such noise.

### 5. REFERENCES

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