Playing The Archive: Transforming Cross-Disciplinary Research Through Visual and Sonic Immersion

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Abstract

Playing the Archive is an interdisciplinary project undertaken by Studio|Lab's core research group - Nilam Ram, Brian Orland, Candice Ng, Michael Coccia, Matthew Kenney- and invited collaborators Simone Osthoff, Mark Ballora and renowned percussionists Robyn Schulkowsky and Joey Baron. Approaching nine different archives that consists of scientific data as well as historical and artistic data, the project brought together social scientists, artists and musicians to experiment with both digital and live sonification, visualization and materialization of data into new aesthetic forms. The hypothesis is that the interplay among musicians, visual artists, and data analysts—working together to simultaneously perform and display the archive in multiple formats and media—will enrich and shape the ways researchers render and engage information. Our experiments with multi-modal visualization and sonification are already changing our understanding of how and why we, as individuals and as a collective, approach archives, and more generally, our history, our work, and our world. These in return allowed for new ways of interpretation to form within these research inquiries. Being involved in the project as both an artist as well as a coordinator, this presentation at SI13 will include sharings on the outcome of the project and a small exhibition on iPads to discover the work.

Keywords: data sonification, inter-disciplinary, archives

1. Introduction

Beginning year 2012, Studio|Lab – a research initiative at Penn State University that is essentially a studio for scientist and a laboratory for artist to test the performance and impact of their work – worked on a interdisciplinary performance project called 'Playing the Archive'.

Led by the renowned percussionist Robyn Schulkowsky and Joey Baron alongside the core-research team at Studio|Lab, the project invited a group of researchers from the College of Health and Human Development and the College of Arts and Architecture at Penn State University to spend 4 days at a workshop to relook at how scientific data can be visualized, materialized and sonified to garner new forms of analysis and understanding into research. The resulting collaboration culminated in a live public performance at the Ruth Pike auditorium at the newly opened BioBehavioral Health Building on 4 February 2012.

With a combination of acoustic and electronic sounds that were radically different from common dimensions in tone and rhythm, the artists merged artistic and scientific languages making music out of data from nine different archives. The hypotheses is that the inter-play among musicians, visual artists, and data analysts – working together to simultaneously perform and display the archive in multiple formats and media – will enrich and shape the ways researchers render and engage information.

I had the opportunity to work closely in this project both as an artist as well as a coordinator. Hence, this paper hopes to share the outcomes and also my observation of the benefits and possible issues of inter-disciplinary collaborations.

2. Archive and Experimentations

Focusing on three major modals of experimentations – visualization, sonification and materialization – each of the nine archives selected within Playing the Archive underwent various iterations and processes before they were finally performed and exhibited.

In this section, I'll break down how each archive is visualized and sonified.

2.1 Innoc-Red

Innoc-Red comprises of data recorded on the response and recovery of infants receiving inoculations. The researchers are interested in the effectiveness of the parent-child interaction during the child's inoculation to investigate how infants and toddlers come to regulate their emotions. For Playing the Archive, three examples of Inoculation Data were being sonified.

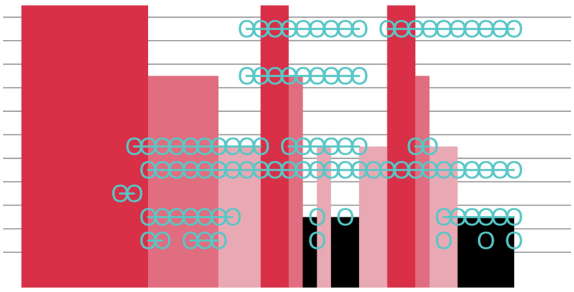

Figure 1. Inoculation Data - Cindy Stiffer (Professor of Health & Human Development, Penn State University).

The darkest red bars represent High Intensity Crying, while the medium red bars represent Low Intensity Crying. The lightest red represents Fussing while black represents no crying. The green circles represents various parent-soothing behaviours ie: pacifier feeding, face to face distraction, vocalizing, rocking, holding, touching and affection. Robyn Schulkowsky and Joey Baron worked closely with Cindy Stifter to translate this interaction between parent and child into a musical conversation between the percussionists.

2.2 iSahib Steps

iSAHIB Steps is a series of data that is a part of the Intraindividual Study of Aging, Health and Interpersonal Behavior at Penn State. The study consists of 150 adults age 18 to 90 years who provided reports about their daily lives, interactions, feelings, and health for 9 weeks between May 2010 and September 2011 – in-vivo, in real-time.

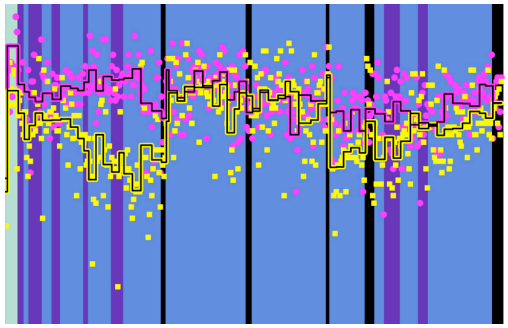

Figure 2. iSAHIB Steps – Nilam Ram (Associate Professor of Health & Human Development, Penn State University).

The sonic representation of iSahib represents two timescales of data from one individual core emotion – valence arousal (y axis) – against a backdrop of interpersonal interactions (x axis), collected over a period of 63 days. Purple represents Low Positive Affect while Green represents High Positive Affect. Pink dots represents Interaction Valence and Yellow dots represents Interaction Arousal.

For Playing the Archive, Robyn Schulkowsky and Joey Baron worked closely with Michael Coccia – data analyst – and Nilam Ram to sonifiy this piece acoustically using percussion instruments.

2.3 Funken

Funken is a study that tries to understand how the early influences of parents on young children occur from moment-to-moment – for example, how and why a new positive or negative interaction pattern begins between parent and child, how each member of the interaction shapes this pattern in real time, why some patterns are short-lived and others become permanent styles of the relationship, and how different patterns ebb and flow depending on the particular situation or the developmental stage of the child and the family.

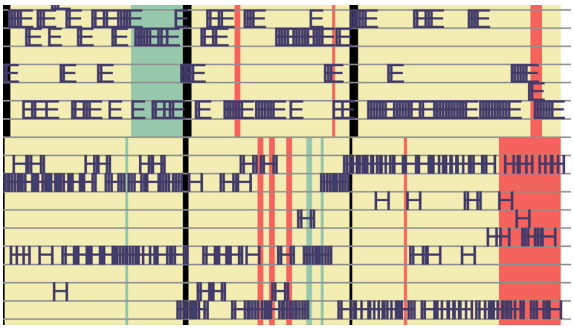

Figure 3. Funken Data – Erika Lunkenheimer (Assistant Professor of Human Development & Family Studies, Colorado State University).

Funken data is data collected on a child-parent behaviour and emotion during a freeplay acitivity, a cleanup activity and a puzzle task. Red represents Negative Affects, Yellow represents Neutral Affect and Green represents Positive Affect. The 'E' in the different lines represents various parent behaviours during the tasks i.e.: teaching, structure, reinforcement, discipline, intrusion etc.

For Playing the Archive, both percussionist Robyn Schulkowsky and Joey Baron worked closely with Mark Ballora – Associate Professor of Music Technology, Penn State – to combine electronic and acoustic sound to sonify this data. Mark Ballora sonified the 'Child' counterpart by feeding the data into the computer to generate very specific expressive sounds while Robyn and Joey sonified the 'Parent' counterpart via a response to the 'Child' using live percussion instruments.

2.4 Supplemento Dominical Jornal do Brasil (SDJB)

SDJB is a cultural newspaper supplement that was published from 1956-1961 in Brazil. It was created by Reynaldo Jardim and included among other Neo-concrete artist the poet and art critic Ferreira Gullar with the sculptor and graphic designer Amilcar de Castro. Based on the ongoing research by Simone Osthoff – Professor of Art and Critical Studies, Penn State - with the help of Candice Ee Ching Ng their research focused on the graphic design evolution of this publication over the 6 years of its existence. The newspaper archive was abstracted from text & images to black boxes and lines. An 'X' was assigned to images and black boxes covered the texts. The intention was to be able to see how as time progresses, the graphic design implementation also changed from being rigid to experimental and sparse. Peifeng Yin (Computer Science Eng grad) then wrote a program to try automating this process. What resulted was a whole archive worth of abstracted forms.

Within the context of Playing the Archive, percussionist Robyn Schulkowsky and Joey Baron used music to "read" the graphic design abstractions of this newspaper supplement, assigning different sounds and rhythms to titles, text columns, concrete poems, and photographs of artworks, also taking in consideration in the white space of the pages. Focusing on the Neoconcrete Manifesto which consisted of eight pages of a weekend cultural section of a newspaper published in Rio de Janeiro on 22 March 1959, the archive became a music score for the percussionist. What resulted was an eclectic set of rhythms whose comcompilation was never before heard.

Figure 4. SDJB Supplement – Simone Osthoff (Professor of Art & Critical Studies, Penn State University).

2.5 Lockbox Data

Lockbox data is a series of data collected by Pamela Cole - Professor of Psychology, Penn State - in her study of emotional development in early childhood with a particular interest in emotion regulation (the ability to modulate one's emotional reactions). By placing a toy within a locked box and giving the wrong key to a child, this set of data documents how the particular child attempts to open the locked box in order to get the toy. The child will inherently be frustrated and this study focuses on how these children cope with their frustrations.

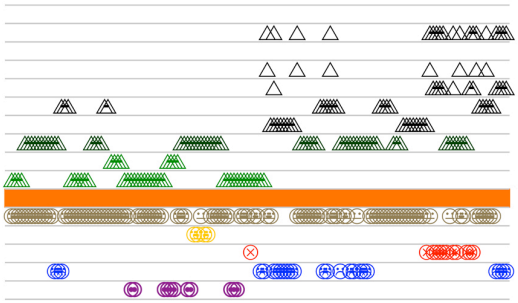

Figure 5. Lockbox Data – Pamela Cole (Professor of Psychology, Penn State University).

For Playing the Archive, Lockbox data was played by data analyst (Michael Coccia), artists (Candice Ee Ching Ng & Matthey Kenney), photographer (Cody Goddard), tuba player (Sean Kennedy), and music technologist (Mark Ballora). Joey Baron led them on the percussion.

2.6 Kente Data

Kente data is a series of data collected from kindergarten age kids while they were watching short videos that were intended to induce particular emotions - fear, sadness, happiness, and anger. Interestingly, although physiological data are collected at 500Hz, scores are averaged across time. In the data, Nilam Ram was looking at RSA (a measure of cardiac function - and activation of the parasympathetic nervous system) and realized they had 30 second averages.

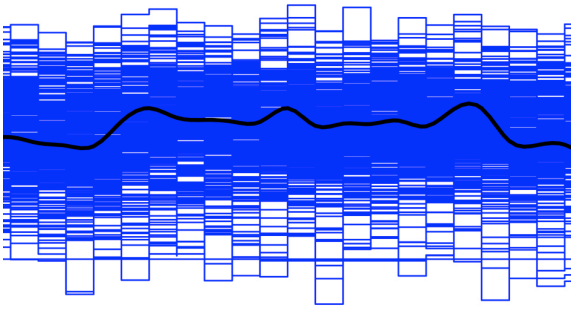

Figure 6. Kente Data – Lisa Kopp (Assistant Professor of Human Development, Penn State University).

Scientific plots are normally made with dots and lines, where each line represents a different person and how their sores change over time. Thinking about the averaging, Nilam Ram decided to plot them as step functions, rather than connect-the-dot lines. This fantastic set of interweaving colors emerged and it looks like a Kente weave.

For Playing the Archive, Robyn Schulkowsky and Joey Baron worked closely with Lisa Kopp to sample acoustic sounds and discuss about the data, as Lisa understands it. The decision was to play Kente vertically as a score as this is how the cloth is weaved instead of horizontally as how one would read a text. What resulted is a cacophony of metal percussive sounds overlapping each other like waves of interweaving.

2.7 Energy Data

Energy data is a set of data collected by Brian Orland and Dena Lang via the Energy Chickens virtual pet game that monitors energy use data collected by Plugwise devices. Each chicken represents a different appliance for which the player is responsible, and the player's energy consumption affects the well-being of their chickens. Players log in daily to care for their chickens and to collect eggs for points. If a player reduces their energy consumption for an appliance, the chicken associated with that appliance will grow healthier and happier and will lay eggs to be collected for points. If a player increases consumption, their chickens will become sick and will not lay eggs.

The Energy Chicken behaviour change game will be one of several energy saving interventions implemented in commercial office buildings by the Occupant Behaviour group within Energy Efficient Buildings HUB. In all cases energy-saving interventions will be accompanied by behavioural response monitoring via comprehensive surveys and ecological momentary assessments.

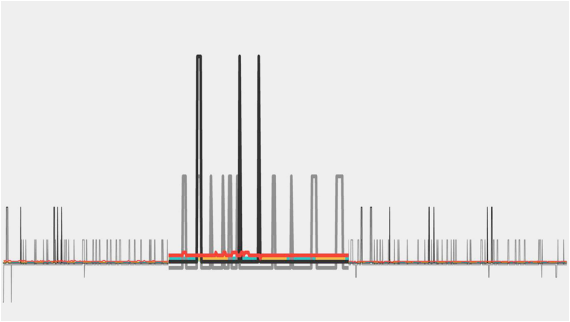

Figure 7. Energy Data – Brian Orland (Distinguished Professor of Landscape Architecture, Penn State University) and Dena Lang (Research Associate in Health & Human Development, Penn State University)

For Playing the Archive, Matthew Kenney sonified the energy consumption of common office devices over time. He created the sonification to reflect the energy use of the devices in a condensed version of the real-time data. The energy data used stretched from a 8:00pm Sunday night into a Monday afternoon, tracking the energy consumption of 6 devices: a computer, charger, monitor, fan and laptop. An increase in energy consumption from the weekend night into the workday morning is reflected in both the data and the sonification, and sounds were created to reflect noises produced by the respective devices as well as the general feel of energy flowing throughout a building. The sonification was created in SuperCollider with the help of StudioLab and Mark Ballora.

3. Observations & Questions

Most of the researchers involved in this project have dedicated their lives to their research. This opportunity to process their studies into another modality has allowed for a reinterpretation of their work and encouraged new ways of thinking and seeing. They each also brought their best to the table during the collaborative process and approached their work both as experts but they were also willing to be malleable in their thinking and learning.

Nonetheless, due to the short time frame that we were given to complete the project, several observations & questions surfaced from the collaboration that is worth addressing.

3.1 Definitions and Language

As each discipline comes with their own set of commonly used terms and definitions, I find that it's important that we take time to learn and understand the specificity of these shared languages before any successful collaboration can take place.

3.2 Openness and Flexibility

Rather than approaching the project with a fixed final outcome, one of the highlights in this project is the openness to allow for shared ideas and the collaborative process to organically form its own structure. While it remains challenging at first as openness can often be seen as being without vision or direction, it is important to instil a practice to be willing to be uncomfortable with questions and utilize it as a platform for discovery instead of dead ends.

3.3 How different can the visualizations be and does that affect how the sonification is played?

3.4 How many dimensions were played in the archive?

4. Conclusion

Playing the Archive will benefit from another iteration to address the various questions raised and possibly perfect the misses we undergo in the first iteration.