

CULTURE, DATA AND ALGORITHMIC ORGANIZATION

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Abstract

The author presents his interactive digital installations of the past decade, featured in museums, media arts festivals and galleries, that engage the audience to contribute data that is then transformed into content and visually projected large scale in the exhibition space. Collected over time, the data occasions further data-mining, algorithmic processing, with visualization of the results.

Earlier projects from the mid 1990s, such as the “Anecdoted Archive from the Cold War” [1], “Slippery Traces” [2], “the [clearing]” [3], “Tracing” [4] and others have explored the semantic-based organization of visual information as a way to contrast differences in reception of visual and textual information at the cultural and perceptual levels. Four major data visualization projects I have realized since the 2000s involve outsourcing the data collection, either directly as in “Pockets Full of Memories” [5], where the public scans an object and describes it through a questionnaire, or indirectly, as in the “Making Visible the Invisible” [6] installation at the Rem Koolhaas designed library [7], in which the data, consisting of titles and metadata of books, CDs, and DVDs checked out by the general public from the library, is received from the library’s server. When such individual local actions as individual checkouts are aggregated statistically, they result in global outcomes. This emergent process is also present in “We Are Stardust” [8], a project realized by invitation of the NASA Spitzer Science Center and the Arts Center College of Design [9], where the visualization of the first five-year observations of the orbiting Spitzer satellite forms into a coherent whole through the sequential mapping, revealing patterns in the sequences of the scientists’ observation choices. “Cell Tango” [10] consisting of a collection of cell phone images with tags contributed by the exhibition visiting public, is globally open for contributions but each exhibition nonetheless features a locally defined aesthetic direction according to each venue’s socio-cultural context.

Each of the projects operates at multiple levels from cultural narrative scenarios to large-scale spectacle visualizations. A unique feature of [5][6][10] is that the installations also function as data collection sites, as the public is activated and willingly participates, contributing information. Through this process, the artworks reflect back to the participants, giving insight into the operations of the way data can be compiled and visualized. The Seattle Public Library installation underscores the library’s expansion into a “data exchange center”, as the approximately 30,000 daily transactions of patrons checking out books, DVDs, etc. are aggregated and mapped on a long strip of LED screens with hourly updated data. Correlation is made between the flow of data (books, DVDs) leaving the library and what the community of patrons considers interesting information at any specific time. As the library uses the numerically based Dewey Decimal Classification system, the circulation of checked-out items is information that can be calculated mathematically and represented visually.

The four animations in SPL [6] cover the breadth of visualizations from literal to metaphoric. They include “Vital Statistics”, a numerical based visualization that gives the total of Dewey, non-Dewey, books, DVDs, CDs and other media. “Floating Titles” is a chronological sequence, a form of linear browsing stream of the last hour’s checked out titles, color-coded red (movies) and green (books). “Dot Matrix Rain” reveals the extensive non-Dewey items as they fall from the top and then fade away at the bottom like falling snow, whereas Dewey items pop up on screen at their numerical location and leave a mark. “KeyWord Map Attack” has a dramatic action visualizing most popular words found in the titles and keywords, color coded, and spatially plotted according to Dewey order and usage. Both the PFOM [5] and Cell Tango [10] installations also feature the aggregated data in various animation configurations. PFOM, which uses the Kohonen artificial neural-network algorithm [11], continuously reorganizes the relationship of all the contributed objects on a large cinematic screen so that each object has a distance proximity to every other object based on their semantic metadata. One of the visualizations [5] therefore traces the objects’ movements on the two-dimensional cinematic screen, revealing that the ordering of this type involves extensive calculations and re-shuffling of ob-

jects, which then results in an abstracted visual representation that expresses the complexity of the organization process.

The installations of mine which collect data (PFOM, SPL, Cell Tango) inevitably lead to a second phase, that of data mining by which interesting patterns are extracted through queries, followed by algorithms for data aggregation leading to visualization to reveal cultural questions or further explore the complexities of visual language, a process that is partially conventional (rule-based), perceptual and/or symbolic, experimental, and syntactically analytical.

Whereas the engineering/scientific communities consider data visualization primarily from a pragmatic and technical analysis-oriented perspective [12], Kosara proposes that a transformation of data into a visual form does not necessarily imply intentions for legibility and may instead explore the language of aesthetic representation to study visual complexity, or a critical reflection on the nature of representation itself.

References and Notes

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8. *We Are Stardust* (2008), <www.mat.ucsb.edu/g.legrady/gIWeb/Projects/st/stardust.html> and <www.spitzer.caltech.edu/images/2899-sig10-001-We-are-Stardust>.
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12. Robert Kosara (2007) *Visualization Criticism – The Missing Link Between Information Visualization and Art*, 631-636. In *Proceedings of the 11th International Conference on Information Visualization (IV)*.