Highways, a generative meditation on the geometry of interchanges

David Bouchard, M. Sc, B. Comp Sc,
New Media, Ryerson University, Toronto, Canada
https://www.deadpixel.ca
E-mail: david.bouchard@ryerson.ca

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Figure 1. A view of Highways

Abstract

This abstract is a proposal for an artwork, entitled *Highways,* to be considered for the exhibition programme of the 24th Generative Art Conference. The work is hosted at https://highways.glitch.com

Highways is a meditation on the intricate geometry of highway interchanges. Using a generative process, a slowly evolving tapestry is derived from satellite imagery, retrieved at random on each visit from a database of curated locations.

A frame drifts over the satellite image, its dimensions and position slowly changing according to random noise. The source

image is sampled based on this frame, then repeated and mirrored along a grid formation to generate the tapestry.
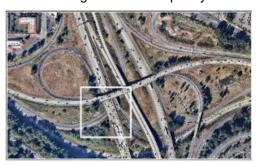

Figure 2. The frame and source satellite image

The pace of the work stands in stark contrast with the bustling arteries that are the subject of its fascination. At times almost at a stand still, the piece ebbs and flows following the leisurely undulations of the noise, leaving space for contemplation.

1. Context

This work shares a fascination for the utilitarian structures that have become a necessity of our urban sprawl with photographer Peter Andrew Lusztyk. In his *Interchanges* series, Lustyk documents the complex architectural features of highway interchanges via

aerial photography. His photographs work to *"transform otherwise functional, banal constructions into photographic spaces for aesthetic meditation: long, linear shadows present a doubling of sensual, concrete curvatures; the static symmetry of the structure poetically contrasts its witness to perpetual movement; conspicuous green space is carved out in perfect geometry, so that the organic and the inanimate mathematically coexist"* [1].

Visual artist David Thomas Smith also draws upon satellite imagery as a source material for his *Anthropocene* print series. Inspired by patterns and motifs used in Persian rug making, Smith creates symmetrical compositions that "*reflect upon the complex structures that make up the centres of global capitalism, transforming the aerial landscapes of sites associated with industries such as oil, precious metals"* [2].

2. Project Description

The work presented in this abstract threads similar conceptual and aesthetic grounds while proposing a real-time generative approach to the subject. The software developed for *Highways* explores the visual transformation of satellite imagery within the confines of an autonomous system [3].

In doing so, *Highways* also constructs a view of the interchanges that is constantly in motion, echoing the perpetual movement of traffic within these structures.

The software retrieves satellite imagery in real-time, choosing from a large set of predetermined geographic locations featuring dense and visually interesting interchanges from around the world.

While these locations are handpicked by the author, the resulting visual composition emerges from a random walk within the image.

The work unfolds over time by slowly exploring the space of visual possibilities afforded by the sampling and repetition of the satellite images within the framework of a mirrored grid. Both the position and size of the sampling are modulated by a naturally ordered sequence of pseudo-random numbers [4]. The resulting visuals' unique character is therefore directly derived from the geometry of the source material, yet also produces a vast array of unpredictable compositions.

3. References

1. Lustzyk, Peter Andrews, *Interchanges,* https://www.peterandrew.ca/#/interchanges/

2. Smith, David Thomas, Anthropocene, https://www.david-thomas-smith.com/anthropocene

3. Galanter, Philip. "What is generative art? Complexity theory as a context for art theory." *In GA2003–6th Generative Art Conference*. 2003.

4. Perlin, Ken. "An image synthesizer." *ACM Siggraph Computer Graphics* 19.3 (1985): 287-296.