New Nomadism

From Digital Tools to Digital Media

Gernot Riether
Georgia Institute of Technology, USA
http://www.coa.gatech.edu/arch/
gernot.riether@coa.gatech.edu

Abstract. We live in a digital world. This article proposes using digital media to intensify our perceptions. An architectural navigation aid by coupling digital media with cognitive processes, a design process will be suggested that requires a shift in thinking from tool to media, from descriptive geometry to constructive geometry, and from stirring media to media that does the stirring.

Keywords: Digital media; emergence; cognition; design process.

Introduction

The digital techniques that architects use to generate drawings, renderings and three dimensional models in CAD programs are usually developed to represent a preexisting idea, an after thought therefore to the actual process of design. This paper has the intention to re-introduce digital media to architecture but this time as a concept and process.

Other disciplines such as music have realized that digital media has more to offer then purely being used to store information. In art new realities have emerged through the intentional misuse, delimitation, imitation, subversion, manipulation, appropriation, destruction and alienation of digital media. As such digital media have been used to support cognitive processes by intensifying our perception whether by continuously experimenting against reality or destabilizing our reality by questioning methods, changing orders, neutralizing rules and revolutionizing discourses.

CAD programs in architecture are more and more accessible and offer significant possibilities for manipulations. The potential of constructing our own digital media within these programs by blending tools, manipulating tools and writing our own scripts has not been fully explored. It is the intention here to offer strategies to intensify our perception of our digital world and to reintroduce digital media as a design process to allow the architect to better navigate the digital world.

Perception

Since there is no singular or correct world-view or reality every expression or re-conceptualization in architecture is based on a given individual’s reality. Therefore it has always been important for architects to expand the possibilities of perception of our environment. Our environment has been expanded and has become to a large degree a digital world.

This digital world is, according to Vilem Flusser, a sand of data, a desert. Understanding the world as a desert of data has enormous potential since the data
or grains of this desert can be reorganized into new realities. According to Ernst von Glaserfeld every new reality, in this case the realities that emerge from the process of reorganizing digital data has the potential to destabilize our cognitive framework and therefore the potential to expand our cognitive constructs.

Using this concept of instability in order to expand our reality there are two challenges or problems that we have to overcome: The first problem relates to the interface of our environment. Our senses provide us with a very limited interface that only allows for very limited access to an environment that is far more complex. The second problem relates to the way our brain functions as a self-reverential network. As described by Humberto Maturana, the brain is an autonomous system that maps through an environment back onto itself. We are therefore continuously trying to match other exterior realities with our own, aiming for congruence.

Vilem Flusser’s conceptualization of the world can help us respond to both of these challenges. Digital tools can be used to construct new interfaces or digital media that can help us to expand our perception allowing us to access information that was not accessible before. Second new realities that emerge from using these interfaces media can be used to continuously conflict with our own reality interrupting the self-referential process of our brain.

Constructing instruments that continuously stir the grains of data and reprocess them into an endless number of new realities is therefore the goal. This stirring and processing requires new kinds of instruments, instruments that can serve as interfaces and that allow a communication or mediation between data and data carrier. The instrument proposed here is digital media.

### Digital Media

Digital media is an interface that allows the nomad or architect to navigate the dunes or data of the desert, our world. Digital media is a system that can stir and process data, that has its own rules and boundaries. Changing the rules produces an endless number of new realities from processing the same data.

Digital media operates fundamentally differently from any physical media. Richard Serra for instance traced in 1966 a Jackson Pollock painting with rubber belts, an artwork known as ‘belt’. He then took the rubber belt trace and hung it from the wall. The curves and shapes transformed according to the gravity that pulled on the rubber belts used. Changing the media from painting to material he created a new reality. If we want to change from a physical media to digital media we have a problem Richard Serra didn’t have. Instead of walking to Canal Street in New York and buying rubber belts that already have certain material properties we have to construct or define these properties ourselves since we don’t have gravity or material properties in a virtual space. But it is not about simulating material properties or other media that we know from the physical world. Digital media allow for a different kind of experiment that is about the reorganization of digital data.

In the 90s Markus Popp, a member of the music group OVAL painted small images on the underside of a CD to make it skip. We can look at this experiment as an early version of using or misusing the medium of painting to reorganize digital information. The information in this case is the pits of the CD. The painting re-relates or stirs the pits of the CD. This stirring of data results in a new synthetic sound reality.

Experimental electronica music for instance uses digital tools as a medium to reorganize the digital data of music. Mica Vainio, a musician that experiments with electronic music is using synthesizers and MaxMSP as an interface or medium to cut, tweak, mix and layer cultural references provoking new synthetic sounds to emerge. These new
synthetic sounds are, as described by Mika Vainio, collected and then reorganized into new pieces of music known as experimental electronica.

**Digital Media and Geometry**

In order to reinterpret complex information digitally we have to define or construct digital media that has the capacity to interpret and process information. In order to achieve valuable results the interpretation as well as the processing of information has to be guided by precise rules and methods. Since the information we are dealing with is abstract and therefore without meaning concepts of transposition information become more important for us than concepts of translation.

If we want to produce a digital trace of a curve that we found within a photograph for example, we are confronted with a series of questions such as: Which geometrical principles do we use to draw the curve in a CAD program? Are we defining the curve by tangents or are we defining it by using control points? How many points do we use to define the curve and how much deviation from the original do we accept? Tracing a curve seemed to be a very simple task but in transposition it with geometry all these questions have to be answered. If the task is getting more complex, more complex geometrical questions have to be answered.

Using digital media it is not our goal to challenge a digital representation of a physical reality or an already existing idea of a form or shape. As mentioned above the goal is to allow new realities to emerge from the interpretation of abstract information using a constructed media. Since we challenge transposition of information and not representation or translation of information the possibilities of new realities that can be constructed by digital media are endless.

**Applications**

In the first part of the project students were asked to find natural patterns that result from natural processes, such as patterns form tree branches, bone structures or water movement and document them through photographs. The patterns selected operated on three different scales: At a scale accessible to our eyes, a scale too large and a scale too small to be perceived by human eyes such as microscopic views. The photographs of these patterns were edited in imaging processing software and traced digitally through CV curves in Maya. A successful trace required a precise definition of the tools used and a precise method of tracing. [Figure 1 and 2]
Tools were defined by setting boundaries and limits; methods were defined by establishing a set of rules. To interpret a three-dimensional trace from the two-dimensional information additional rules were introduced.

In a second part of this assignment the three-dimensional traces were used as scaffolding that was interpreted again. This time the media had to be constructed by blending tools found within NURBS geometry [Figure 3]. Within this specific geometric method tools were selected and boundaries and rules defined. After the method of tracing was established the tools used were customized and combined and networked into scripts. Now the scaffoldings were exchanged between students, which allowed executing the same script on different scaffoldings or using different scripts on the same scaffolding. It became clear very soon that the possibilities of generating new realities from the same information were endless.

**Digital Media and Fabrication**

Developing a physical structure or spatial model from our digital traces that can be interpreted architecturally a new form of digital media has to be introduced that is based on geometric principles that relate to the digital model. Similar to the first part of
the project the challenge is to construct new realities by interpreting the information of the digital model and not a representation of that model. It is therefore of interest using digital fabrication methods such as laser cutting as a medium that can be used to interpret the information from the digital model in different ways.

Curves for example can in the physical space inform basswood rods or paper strips that eventually will inform a wire frame model that might be interpreted as structure. But the same curves might also inform cuts in a basswood plate or sheet of paper and be interpreted as skin or used as a strategy to generate apertures. The materiality re-informs the curve and generates depending on the material and scale different interpretations of the digital model.

Constructing a media from the different possibilities of digital fabrication tools as well as the different properties of different materials different realities can be generated each of them informed by the digital model but not trying to represent it.

Applications
In this second part of the project students were asked to test different methods of laser cutting. In addition they were asked to experiment with different materials such as chipboard, wood or different plastics and different scales.

Students for instance manipulated material properties by informing the material with patterns that were cut or scored in the material. [Figure 4] The material in that way was informed by another information that impacted the original material properties. This new material performance together with a set of rules of reconnecting points within the system for instance informed three-dimensional structures. [Figure 5,6 and 7] The variables of the media that defined how the laser cutter cuts, what material was used and what scale was determined was used to change and manipulate the outcome in multiple ways. The chance of new realities to emerge by constructing different media by changing materials or scale for example was large. Being confronted with
continuously new realities or new ways of looking at the same information helped us to intensify the perception of the original information, a feedback that motivated us to go back, reconfigure our media and run the experiment again.

**Conclusion**

Operating within different methods of geometry provided by CAD programs to construct digital media the challenge is to maximize the chance of generating new surprising realities from pre-existing data. Digital tools can be used to construct scripts that can be used as media in order to construct new realities by reorganizing and interpreting abstract information; digital fabrication tools can be utilized as media to generate different interpretations. This difference in the use or misuse of digital tools requires a shift in thinking from media being stirred to media doing the stirring. Since the media is constructed based on feedback, the rules and boundaries that defined the digital media have to be developed in a constant feedback loop.

In that spirit an endless amount of different media and new realities can be created and the architect will navigate the dunes of the desert by using digital media as his vehicle.

**References**

Oval: 1991, Electronic music group founded in Germany, the band’s original members were M. Popp, S. Oss chatz, and F. Metzger.
Pits: tiny indentations that store the data on a CD.
MaxMSP: Graphic Interface developed for music and multimedia.