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THE OTHER DIGITAL

What is the Glitch in Architecture?

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Abstract. This paper will discuss and investigate the issues with the concept of 'glitch' in architecture. There are currently two definitions that sit in a symbiotic relationship with each other; Moradi's (2004) and Menkman's (2011). This paper will explore the implications of these two approaches, while investigating the possibility of a third, unique definition (the encoded transform), and what effect they have on the possibility for a 'glitch architecture'. The paper will then focus on the glitches' capacity to be disruptive within the design process. In the context of architecture, it has been previously argued that the inclusion of glitches within a design process can easily create a process that does not 'converge' to a desired design outcome, but instead shifts haphazardly within a set of family resemblances (Austin & Perin 2015). Further to this, it will be revealed that this 'divergent' quality of glitches is due to the encoded nature of architectural production.

Keywords. Glitch aesthetics; Theory; Algorithmic Design; Process.

1. Introduction

The term 'glitch', and what it has come to represent within digital culture, forces the term to be an umbrella for all sorts of digital, electrical and new-media artefacts which may or may not be at odds with the intended *meaning* of the word. Although there are pre-existing definitions that function effectively within the scope of scientific and artistic analysis, these definitions are problematic for more design-oriented disciplines such as architecture.

The value of such a discussion is two fold. Firstly, it allows for a new method of understanding and critiquing architectural production. For example, the processes of Peter Eisenmann's *House Series* along with the architectural implications of !Mediengruppe Bitnik's *H3333333k* both represent two disjunctive forms of architecture that relate to glitches in their approach. Secondly, and also the focus of

this paper, it opens up *new* methods of working within architecture. As stated previously, glitches within the design process can easily generate methodologies that do not *converge* to the designer's desired outcome (Austin & Perin 2015, pp. 831-834). Instead the glitch offers a disruption to the process and shifts haphazardly within a set of family resemblances.

Thus this paper will conclude with an exploration of 'glitch' techniques that have the capacity to be disruptive to architectural production and investigate the issues around them.

2. Definitions of Glitch and their Problems

From a scientific standpoint, a 'glitch' is an unexpected spike in an electrical current (Wakerly 2006, p. 224) or the phenomena of an algorithm behaving in a way that is unexpected to either the programmer or the viewer (Moradi 2009, p. 8; Scott 2009, p. 20). At first glance this appears to be a pragmatic and useable definition. For example, if a simple logic-gate circuit or algorithm returns the incorrect response, clearly something that objectively resembles a glitch has occurred. This naïve-scientific approach has two serious flaws. Firstly, electrical systems are rarely simple enough to check if a glitch has objectively occurred without specialist knowledge and skills. Secondly, the word 'unexpected' implies a relativist-subjectivity to the term. In other words, it is possible for a viewer to proclaim that a glitch has occurred within a system that the engineer or programmer has set up to work in *exactly* that way. The glitch thus embodies a more complex techno-social relationship than merely an objective state of error and is indefinable within only an objective-scientific framework.

The unavailability of a clear-cut objective approach to understanding what the glitch *is* has lead to artistic practices, under the guise of 'glitch art', to develop subjective approaches to understanding what constitutes glitch.

The first of these approaches, devised by Moradi (2004, pp. 28-32) attempts to attribute *features* to glitch artefacts. In other words glitches *look like* glitches. Moradi points out that:

- Defining its visual characteristics now would probably serve as a 'record.' to map its evolution or to document an appreciation arising from a drive towards its extinction as other more interesting and powerful visualization technologies are invent. (Moradi 2004, p. 71)

Any aesthetic features that can be attributed to the glitch are bound to the technology that houses them. As technology changes, the features that identify a glitch must change with it. Moradi's (2004) approach leads to a definition that is forever requiring revision; the definition is in constant flux. Nevertheless, the features that Moradi (2004, pp. 28-32) offers, namely *fragmentation*, *linearity*, *horizontality* and to a lesser extent *complexity*, have been consistent features in the production of glitch art over the past decade.

In contrast, the second of these approaches, offered by Menkman (2011), attempts to attribute a phenomenological character to the glitch; Menkman (2011, p. 31) calls this character 'the glitch moment(um)'. For Menkman (2011), a glitch

is the embracement of the subjectivity of the viewer. The unexpected behavior of technology that prevents an objective-scientific definition is embraced as the core feature of what constitutes a glitch. The techno-social context of a glitch's occurrence is fundamental to its identification. A glitch, within this framework, is a break from a pre-established pattern being presented to the viewer or user of the technology in question. Menkman explains:

> • Through the distorted images and behaviors of machinic outputs, the viewer is thrown into a more risky realm of image and non-image, meaning and non-meaning, truth and interpretation. The machine no longer behaves in the way the technology was supposed to...Though at first the viewer reacts with shock and perceives the experience as a loss, the glitch cannot be subdued as a solid state of perception. Just as the understanding of a glitch changes once it is named, so does the notion of transparency or systemic equilibrium supposedly damaged by the glitch itself. The 'original' experience of rupture is moved beyond its sublime moment(um) and vanishes into a realm of new conditions. The glitch has become a new mode; and its previous uncanny encounter has become to register as an ephemeral, personal experience of a machine. (Menkman 2011, p. 31)

Within this context, glitches and their synthetic counterparts - otherwise known as 'glitch-alikes' (Moradi 2004, pp. 8-11) or 'domesticated glitches' (Menkman 2011, p. 55) - are impractical to tell apart. Things that merely look like glitches based on either their attributed aesthetic features and/or techno-social context can be indiscernible from '*real*' glitches.

These approaches to defining what constitutes a glitch have held up within digital-art practice as the final glitch artefact is rarely removed or abstracted from its original techno-social context; glitch art is more often then not viewed on monitors. However, when this is done, for example Ed Grant's oil paintings of his glitch art, problems arise as aesthetic attributes that would otherwise be discernable as 'digital artefacts' become merely elements of abstraction (Austin 2015).

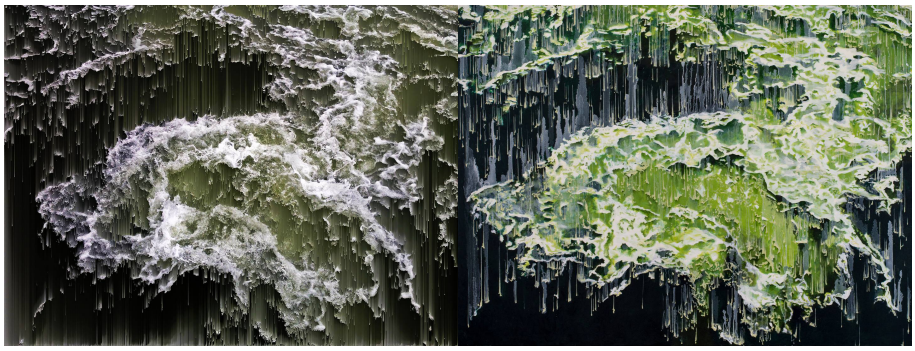

Figure 1. Ed Grant's 'Churn' as both a digital pixel-sorted image and as a oil painting. Reproduced with the permission of the artist.

Although this is a minute point in the context of art, within the context of architectural production, the translation from digital media to physical artefact is common. Glitches within built architecture risk being enveloped within other architectural ideologies. Just as abstraction can encase glitch art when it shifts media, deconstruction and post-modernism can just as easily encase glitch architecture. Although it may eventually prove inevitable that glitch becomes a new wave of these movements, it is in this author's opinion that it should not be accepted uncritically.

3. Glitches in Architecture and the H3333333k Approach

It is common in art to *stretch* the notion of glitch to encompass analogous systems. For example, a genetic mutation or the failure of a building is often referred to as a 'natural' glitch. The use of analogy should be viewed with caution as it strips the term 'glitch' of whatever specificity it may entail to make it absolutely synonymous with 'errors' and 'mistakes'. The glitch, unlike mere error, is embedded purely within electrical systems; its use outside this context is always analogous.

Just as Figure 1 highlights the electrical-dependent nature of glitch art, !Mediengruppe Bitnik's *H3333333k* highlights the same problems within the context of architecture (Austin 2015). The façade was designed by taking a photograph of the existing façade of the *House of Electronic Arts Basel* (*HeK*), data bending the JPEG compressed photograph (i.e. editing the image through its textual representation) and then reconfiguring the original façade to resemble the data-bent photograph (Weisskopf & Smoijo 2015).

The problems this project reveals are two:

Firstly, it is clear that the architecture is being deformed to *resemble* the data-bent image. That is, the façade is designed to produce a photograph that is similar to the data-bent photograph used in the production of the façade. In this sense the semiotic disruption of architectural elements becomes analogous of a glitch in order to render the effect that the building has been data-bent. However, the building, unlike its image, is not a JPEG. The resultant building merely renders the *illusion* of a digital artefact by folding - in a Deluzian sense - the flat-digital viewport of the monitor onto non-digital space, thus giving the illusion of a glitched architecture. The problem is that this folding is not overtly novel or unique in respect to the glitch; it is merely another novel image rendered through anamorphic projection similar to the works of Felice Varini.

Secondly, although the resultant transforms from this process disrupt the semiotics of the architectural elements, the process is severely limited in its capacity to make *spatial* transformations. Architecture is inevitably tied to space and thus transformations of it. To further compound the issue of the glitch's buildability, architecture is consumed in a very different way from images. Not only are there infinite viewpoints of *H333333k* in which the illusion is not rendered, but there is also an inhabitable space behind the façade, which has not been, for lack of a better term, 'glitched'. The problem here is that a two-dimensional image can only represent a very limited amount of spatial information and that architecture is usually communicated with a very large amount of two-dimensional images.

For the glitch to have a novel spatial-potential within architecture its value lies in the production of architecture not necessarily as a direct visual gimmick. Although at first it may seem oxymoronic to have a glitch architecture that does not necessarily render glitches into its built form, the potential design space of such an approach is not only much more open, but capable of dealing with more complex spatial design intent. It is worth noting that the glitch in glitch art is still a process-oriented approach, the only difference is that these glitch artists work directly on the final artefact while architects work purely on representations of that said artifact (Evans 1997, p. 156).

4. The Encoded Transformation

Design objects are not necessarily artworks. The consequences of such a distinction are important. Artworks are justified metaphysically to the artefact in question; it is given meaning and *aboutness* via its *causal history*. (Danto 1981). In other words the mode of production gives qualities and value that may not be embedded within the final artefact. In contrast, design objects, such as architecture, commonly do not have meaning and instead justify their processes via the artefact itself with notions of functionalism and 'good design' (Dilworth 2004). Design objects thus commonly do not have meaning. The difference between art and design causes problems for Architecture to apply glitch aesthetics in the same methodologies as art practice.

As highlighted previously, the term 'glitch' is not easily defined. Both Moradi's (2004) and Menkman's (2011) approaches look at the glitch through the lens of aesthetics - which in the case of Menkman (2011) is contextually based.

As a drastic departure from these notions of definition, I would like to investigate the causal history of the digital artefacts these definitions hope to describe. The value of such an approach is the shift in understanding. Rather than a 'glitch' being understood via its aesthetic properties, it can be understood as a *process* or *technique*.

Glitches, whether synthetic or real, purport to be moments where instead of technology creating the illusion of transparency, allowing us to look through the display device directly into the model or image, the glitch is the moment where the technology embeds itself onto the display devices, thus breaking the illusion (Menkman 2011, p. 30).

This 'illusion' of transparency is embedded in all modes of communication as highlighted by Shannon's Model (Shannon, 1948). Information is encoded from a humanistic form of communication, for example images, into a non-humanistic form to be stored and/or transmitted, and then decoded back into the humanistic form when required.

The advantage of digital technologies specifically is that once information is stored it is still mutable. This gives rise to two types of algorithmic transformations. The first, and most familiar, are '*pre-encoded* transforms'. These transforms operate on what the information represents. For example, image filters go to great algorithmic lengths to manipulate the linear sequence of characters on the computer drive that represents the image in order to produce the desired effect. The

second type of transform is the '*encoded* transform'. These transforms act with no regard of what the information represents. For example, rather than using an image filter an image may be distorted by manipulating its binary, hexi-decimal or ASCII representations. Encoded transforms operate upon the information and thus not what the information represents leads the formal outcomes of such processes unpredictable.

The conceptual importance of this distinction between pre-encoded and encoded transforms is that the encoded transform embeds within it all glitch processes. All glitches, whether natural or synthetic are born through an encoded transformation of some sort with the exception of individuals using pre-coded transforms with the intent of producing a glitch aesthetic.

As previously argued the difference between these two algorithmic approaches via highlighting pre-coded transforms, in other words traditional-architectural algorithmic approaches, are likely 'convergent' within the design process while encoded transforms, and thus glitches, are 'divergent':

- Glitching, however, takes small variations within the ASCII, hex or binary textual representation of an image to create vastly divergent formal arrangements. Every step in the glitching process generates an uncontrollable and unpredictable result, forcing the designer to procedurally move sideways as they evaluate unexpected outcomes. Glitch aesthetics demands the designer adopts new design reasoning. The convergence of algorithmic processes involves an active interplay be-tween code and designer, whilst the glitch-alike requires the designer to be reactive. Unlike 'Processing's' 'convergent' outcomes, the core difference and, therefore, potential of glitch aesthetics lies with its capacity to generate 'divergent outcomes'. (Austin & Perin 2015, p. 832)

This author, therefore, provides a definitive explanation of what constitutes 'glitching'. 'Glitching' is *any* approach that seeks to drive outcomes via transformation of encoded information with no regard for its meaning. In contrast, the algorithmic processes used within architectural production are traditionally concerned with the meaning of the information to make informed and authored design moves.

5. Approaches to Glitch Architecture

Artists are free to deal with the perception of glitch architecture through its distortion as a graphic image such as !Mediengruppe Bitnik's *H3333333k* and the architectural-focused collages of Oliver Ratsi (2011). These processes are dependent upon the architecture already existing to give rise to these effects. It is however, possible for the final model to be glitched or a render to be glitched and remodeled. However, unlike artists, architects inevitably deal with not only the spatial consequences of such images, but also pragmatic and functional concerns. In this sense, for the glitch to be practical, there is likely to be a further design phase to deal with these issues as glitch artefacts have no explicit strategic or formal architectural ambition embedded within them.

In a digital-design context, an encoded transformation requires a computer file to transform. In the context of architectural production, two types of file-format types dominate the production process; two-dimensional images and three-

dimensional models. It has been highlighted previously that the increased complexity of a 3D modelling file makes it impractical to successfully execute an encoded transformation while leaving the file operable (Austin & Perin 2015, p. 835). The work of Mark Klink, shown in figure 2, shows the successful process of such an encoded process when it is exhibited. A glitched .OBJ will *always* offer the same formal features; parts of the figure will be distorted and become 'pointy' in the same way.

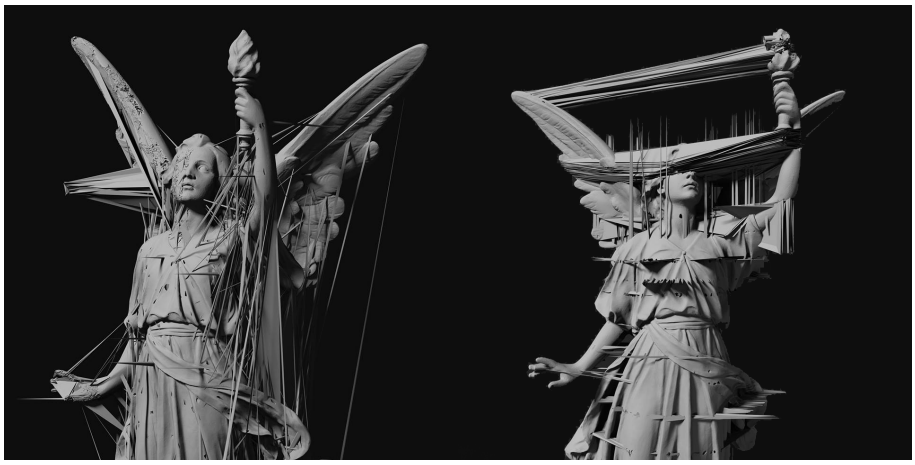

Figure 2. Mark Klink's 'Lucy01' and 'Lucy03'. Reproduced with the permission of the artist. .

The two-dimensional image has more creative potential than the OBJ for three major reasons. Firstly, image files are easily translatable into different types of image files; for example a .PSD can easily be changed to a .JPG. Secondly, image files can easily be translated into different media and back again; for example an image being turned into sound and back again through a .RAW extension being opened in Audacity. Finally, the set of possible families (Kipnis 2008, pp.197-201) is much larger as not only does every file format offer a different family (figure 3), but some degree of image-analysis algorithm is required to translate these glitches into three-dimensional spatial form; thus multiplying the number of possible families. Therefore the potential of the two-dimensional image within a design context thus dwarfs that of the OBJ.

Each of the images within Figure 3 are generated through a variation of file formats with differing degrees of distortion to the original figure of the drawing. In some instances the encoded transform, destroys any resemblance to the original figure, while in others only slight distortions are maintained. Nevertheless, each image has its own creative potential to be used in the production of architectural space. Glitch techniques thus embed a series of new challenges for architectural production. Just as the 'stopping problem' presented a problem for time-based processes for digital architecture in the 1990s the glitch proposes the 'starting problem'. With what glitched material is it appropriate to *start* translating into spatial expression? The consequences of this problem are not yet clear within architec-

tural production. To highlight the difference in approaches, Austin & Perin (2015, p 835) focus on a process that starts with glitching a planar drawing, while Haslop et al. (2016) investigate a system that invests itself in glitches of an old Motorola phone.

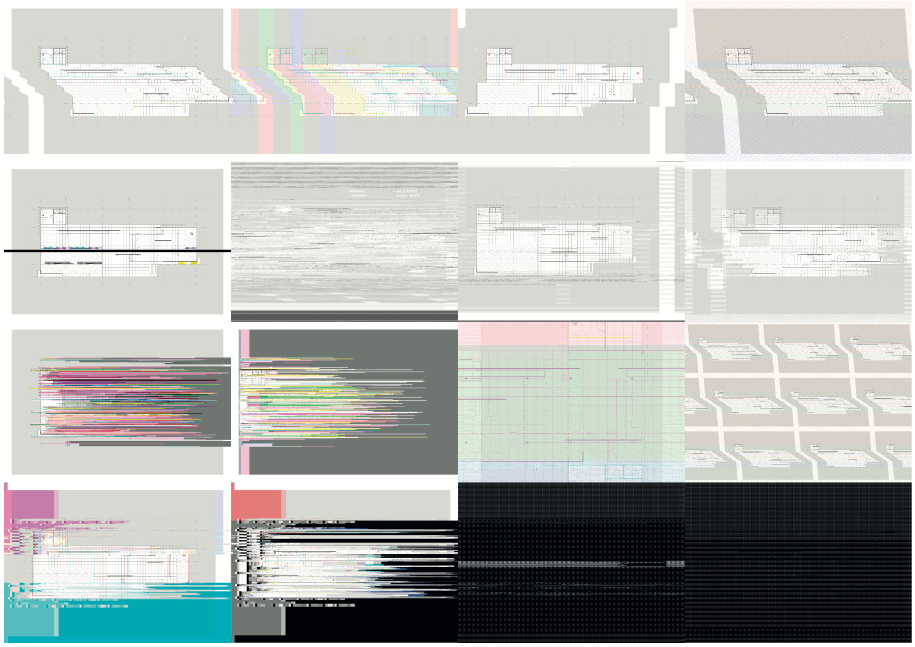

Figure 3. A range of glitch data bends operating upon the same architectural plan.

6. Conclusion

Architecture proposes unique and novel hurdles for the embedding of glitch aesthetics within its discipline. It asks questions of glitch aesthetics in which artistic practice has not invested itself. The glitch in architecture delivers two very important realisations. Firstly, within architecture glitching is more practically understood as a method of production (i.e. the encoded transform) than as an aesthetic style. And secondly, inevitably it must be synthesized through algorithms and architectural intent to be spatialised.

Within artistic practice the glitch has over time become formal in the sense that the glitch is inherently outcome-oriented. In other words, the gesture of the glitch is inevitably attached to the aesthetic qualities of the artwork. Although the glitch cab be formal in architecture, it may also have the potential to be formative (i.e. process-oriented). An architect's design process is glitched and re-resolved into a spatial system which may then be glitched again; these acts of glitching are not design moves themselves but mechanisms to resist the convergence of the architect's design process opening them up from the normative and predictable behaviours of the algorithms upon which architectural production is now built. In

turn architecture offers the capacity to understand glitch aesthetics as parts in a larger whole, rather than as an effect that is applied to the information at the last moment for aesthetic or conceptual merit.

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