Territories of Compression

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MEDIA ECOLOGIES

Our environments are increasingly saturated with digital technologies, entangling our physical surroundings with ubiquitous digital layers consisting of data, interfaces and infrastructures. While the resulting accidental planetary megastructure [1] is affecting even the most remote regions of our globe, digital technologies manifest radically differently across localities and scales [2]. These technologies are rewiring territories, tethering our everyday lives to remote locations of resource extraction, producing new centralities, power structures and border conditions, hi-res and low-res areas... While the spatial proliferation of digital technologies is largely invisible, it is also producing new ways of seeing and sensing, mapping and visualizing our world [3]. The technologies producing these new visual regimes range from remote sensing and satellite imagery to computational modelling and data visualization, to mapping services, geolocated images, lidar and photogrammetry to the plethora of images and videos shared through social media. The produced images are no longer singular media artefacts, they are tagged with metadata, processed, stored and filtered through algorithms, they have become part of layered digital media ecologies connected through hyperlinked graphs of metadata [4]. Contemporary digital media ecologies, which Sy Tafel describes as entanglements of code, content and hardware, are no longer just representing but increasingly producing the environment, as our world is increasingly experienced and made through digital media.

POLITICS OF COMPRESSION

Compression is defined in data science as the reduction of file size or bandwidth needed to represent information by using fewer bits to enable efficient storage and faster transmission, by removing redundancies. While the concept predates the digital and literally means 'condensation of thought', it was formalized in 1948 by Claude Shannon in his seminal paper, *A Mathematical Theory of Communication*, which gave rise to the field of information theory, introducing foundational concepts like bit, or binary digit, which became the basis for developing digital computers [5]. Shannon makes a distinction between lossless compression that allows the information to be completely reconstructed and lossy compression, where information is removed, to an acceptable degree specific to

the medium. As media historian Jonathan Sterne argues, compression is more than distinct data reduction, it is a process that "renders a mode of representation adequate to its infrastructures" [6]. In that sense compression does not only impact the content of the information but has a reciprocal relationship to the material infrastructures that enable its storage or transmission [7]. Combined with developments in hardware and software, these early theories set in motion the evolution towards the digital revolution, gradually shrinking computers, from mainframes over workstations, to personal computers, to portable, mobile and ubiquitous computers and smartphones in all our pockets. The development of digital communication protocols did more than connect devices; they retrofitted networks of cables and data centers into our existing urban forms. As Shannon Mattern explores in *Code and Clay, Data and Dirt*, this enmeshing of digital technology within the physical environment does not just link computers; it rewires our territories, turning the city itself into a material media infrastructure where the logic of the bit is forever bound to the material history of the city [8].

The proliferation of digital technologies has led to the post-digital condition, which Florian Cramer [9] defines not as the absence of the digital, but as a "contemporary disenchantment" where our fascination with digital gadgets has become historical. In the context of Territories of Compression, this state is characterised by the tension between 'hi-res' corporate aesthetics and the 'low-res' reality of our technical infrastructures. As Carolyn Kane [10] argues, the failures, noise, and glitches of these systems are not mere accidents but are foundational to the aesthetic of the contemporary moment. In artistic and design practices, post-digital attitudes move beyond the sterile, seamless interfaces of high-tech and instead embrace what Menkman calls a "vernacular of file formats" (Menkman 2010). By deliberately exposing the artifacts of lossy compression – the 'low-quality trash' of the mp3 or the pixelated satellite tile – designers can perform a 'deep mapping' of the territory, revealing the 'black box' of the infrastructure. This move toward the glitch is not merely aesthetic; it is political. The glitch is a 'refusal' of a system that seeks to categorise and capture us [11]. By abusing digital technologies beyond their intended purposes, the Territories of Compression project treats the broken mesh and the compressed fragment as a site of agency, turning aesthetic failure into a tool for counter-cartography.

EXPANDING TERRITORIES

In architectural and urban theory, compression is often discussed in related terms such as the *density* or amount of usable floors within a certain area [12], the radically heterogenous mixture of program

and activities that result from the *culture of congestion* [13]. Most explicitly, however, it manifests as time-space compression [14], driven by economic and political forces that seek to 'annihilate space with time' to accelerate the turnover of capital. The impact of digital technologies on physical environments is inherently transscalar; it operates simultaneously across the microscopic scales of digital protocols, the architectural scales of the retrofitted city, and the planetary urbanisation [15] of resource extraction and satellite networks. Within this transscalar framework, the city functions as a layer in a larger computational stack (Bratton 2015), where 'hi-res' zones of premium connectivity are carved out of 'low-res' landscapes – a phenomenon of splintering urbanism [16]. Compression, therefore, is not merely a technical reduction of data, but a spatial and political strategy that reshapes the territory, forcing our physical environments to accommodate the global logistics enabled by digital technologies.

Compression can be understood as the densification of information within the digital, but also as information spilling from the mediated spaces of digital technology into lived spaces, rewiring the territories we inhabit. As technology becomes embedded within our societies, through sensing, mapping and tracking technologies, the digital is informed by the material world. Compression operates on the interface, the intersection, or the blurring between the mediated and lived spaces. Digital technologies are not neutral, access to data and computational power depends on economic and political power in addition to technological infrastructure. Tech companies and digital platforms are emergent economic and political powers approaching or even surpassing the wealth and power of sovereign nation states [17]. As such, compression can be broader understood as having societal, political, economic, experiential, aesthetic and spatial dimensions. Vertically compression is interconnecting or delaminating different layers of the stack that make up the accidental technological megastructure, horizontally compression is ubiquitous but unevenly distributed, resulting in hotspots, contested territories, in-between zones and shifting borders. With technological innovation pushing for an ever-increasing bandwidth, resolution and framerate, current temporal and partial manifestations of compression might be short-lived moments on path to a seamless integration of the digital and the material. We approach compression as a means of grasping the contemporary moment, explore what these dimensions mean for design disciplines engaging the complexities of contemporary surroundings.

DATA MINING

Digital technologies have been deeply affecting architectural practice and culture, as architecture is increasingly designed, constructed and experienced through digital media. We can trace the interests of architects in the digital from formal exploration with digital modelling software, over prototypical experimentation with digital fabrication and material articulation to the recent ventures into data driven design. Digital technologies were mainly approached as more efficient tools for designing and constructing architectural projects, however, this predominately instrumental approach of digital technologies left architecture largely blind to the deep societal, environmental and cultural impact of digital technologies, outlined above. While these emerging technologies have become inextricably interwoven in the very fabric of our environments and permeate our visual cultures, general architectural practices seem to lack the capacities and tools, or even willingness, to engage this ubiquitous technological layer. The digital tools and platforms architectural practice relies on are not neutral, but embedded in infrastructures entangled with capital, extraction, and computation. The History of BIM map reveals the influence of investment giants like BlackRock and Vanguard— also major players in fossil fuel, military, and surveillance industries. Joanie Lemercier's *Autodesk.earth* exposes how companies like Autodesk are directly implicated in coal mining, deforestation, and climate-impacting practices. These tools, often seen as benign or purely virtual, are deeply complicit in the ecological and political crises we face.

Within media arts and more avant-garde architectural and design practices there is more willingness to directly engage with the post-digital condition outlined above. Sam Lavinge has developed scrapism as an artistic and technical practice to reveal and critique hidden power relations in online platforms and technical systems. Scrapism is the practice of automatically accessing and downloading data from websites beyond their intended use. It is appropriating methods and practices used by technology companies and governments for commercial and surveillance purposes. Scrapism uses automation to process vast amounts of data, ranging from text and metadata to images and video. The downloaded data is structured and represented in a format that allows users to navigate these data sets and to present counter-narratives. Through techniques from media arts and computational design – scraping, scripting, animating, visualizing – we claim agency over the infrastructures that shape our work. Inspired by Sy Taffel's call for postgrowth media ecologies, we aim to move beyond instrumental, growth-driven design toward modes that foreground care, critique, and complexity.

BEYOND BLACK BOXES

The project *Territories of Compression* investigates the impact of digital technologies on our surroundings. We use compression as both a technical process of data densification, and as the profound spatial, political, and societal force that actively restructures physical territories through this densified information. The core of the project consists of generative software that assembles an ever-changing compressed landscape from a database of fragments, images and metadata, rendered across two screens [fig. 1].

Figure 1.

The fragments [fig. 2], mined and gathered from online data sources, represent instances, places, artifacts and landscapes where digital technologies manifest themselves in our surroundings. These range from sites of resource extraction, energy production and often hidden infrastructures like data centers, carrier hotels, cell towers, underground cables that enable digital networks, to artificial natural elements, hybrid natures, landscapes of automation and fulfilment centers, satellite calibration targets, landscape interventions anticipating satellite views, to highly mediated hotspots, media facades and iconic buildings designed to be photographed from specific angles, to film sets and theme parks and experience museums, to Instagram backdrops [fig. 3-7]. These fragments are scraped as 2D image tiles and 3D models from mapping services such as google maps and google earth. While these mapping services present themselves as a neutral representation of the world, they are highly constructed and highly political, territories differ in resolution and zoom levels, some areas are in 3D while others are in flatland. These mapping services are based on governmental, military and commercial datasets, often including different time frames, fidelities and resolutions. Combined, they provide not a singular master image, but a plurality of views, that allow for navigation in time as well as space. The meshing algorithms struggle with highly detailed elements like trees, scaffolding and construction, resulting in a familiar yet estranged aesthetic.
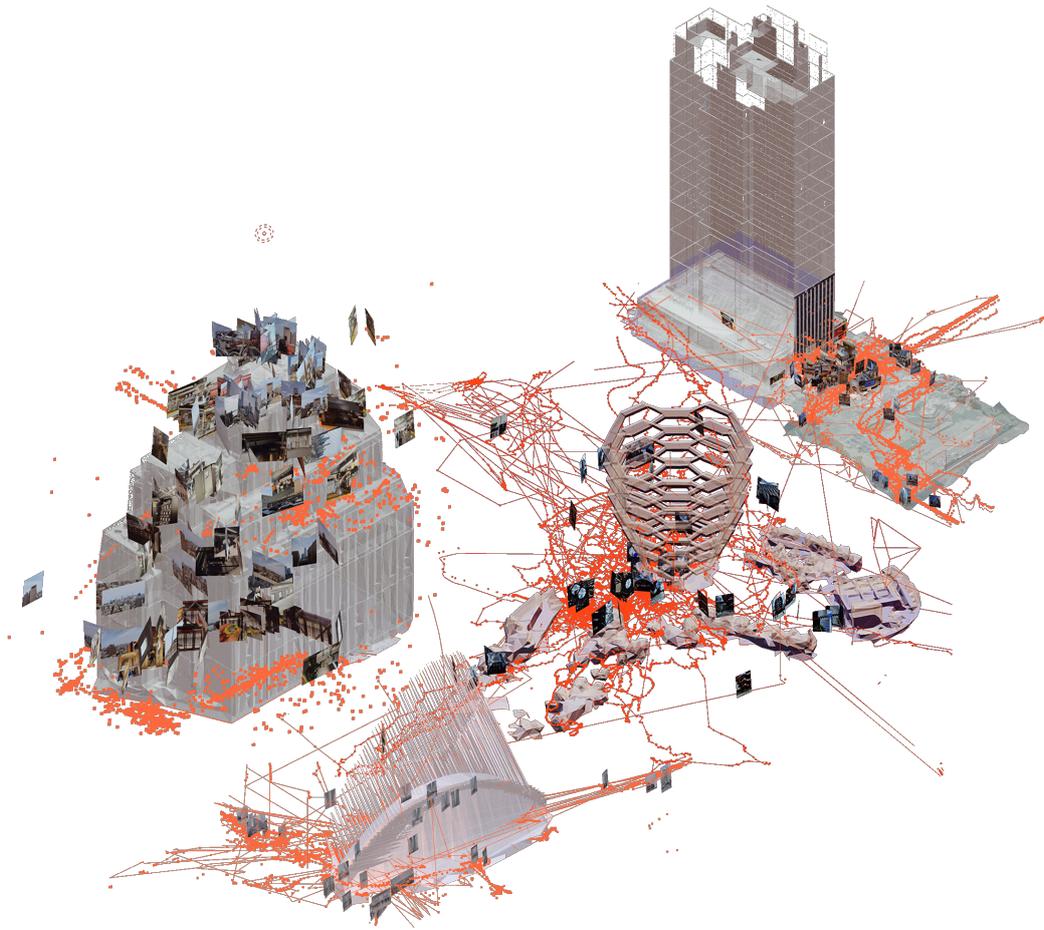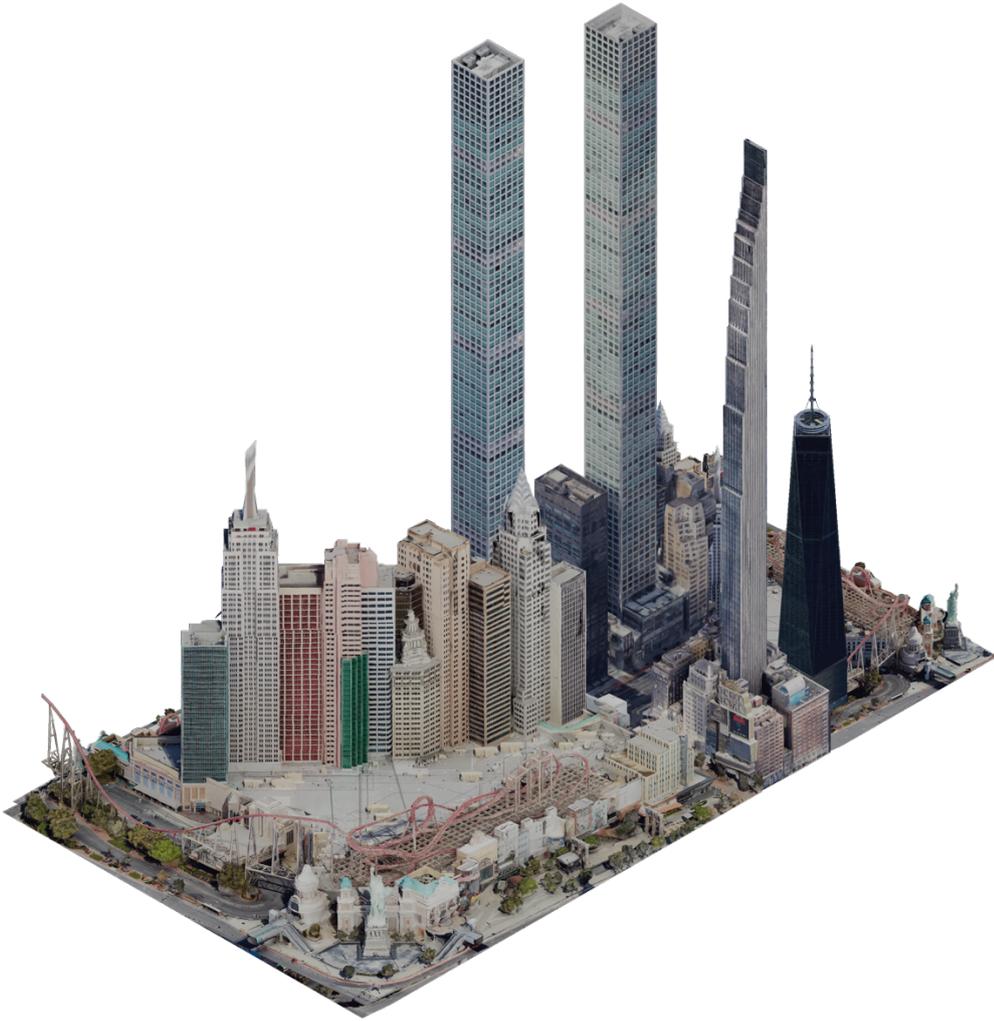
Figure 2.

Figure 3.

Figure 4.

Figure 5.

Figure 6.

Figure 7.

While the fragments depict physical structures, places and landscapes that range from invisible to highly visible, the work also shows the presence of these fragments in online media ecologies and visual cultures. Overlaying collections of images obtained through image searches and web scraping with related metadata, location, year, tags, allow for hidden connections to be rendered visual. but also drives the assembly of the urban landscape. By appropriating and recombining the data from various sources, the project produces a counter cartography that reveals political, social and ecological entanglement of digital technologies and the complexities of the post-digital condition. It reveals how architecture and our urban environments are shaping and enabling this post-digital condition, while also being shaped and affected by it and that the tools architects use to visualize and design the world are intricately connected with it.

The work is generative in the sense that it uses custom written software that allows to endlessly generate novel associations and reveal connections between fragments, by combining text and images. This results in an open generative worlding, that reveals its inner workings, in contrast to most digital technologies and platforms and tools that operate as blackboxes. The recent increase in accessibility of generative AI tools accelerates the relationship between image, data and territory that the project addresses. If the digital revolution has turned the world into a database, then the role of the architect is no longer just to build, but to curate, script, and reassemble. By moving from closed black boxes to open generative worlds, we treat the software not as a solution-provider, but as a site of critical inquiry. This approach shifts the focus from the finished architectural object to the generative system itself. It allows us to ask: What happens when we break the 'seamless' interface? Can we use the tools of automation to visualize the very infrastructures that automation seeks to hide? By reclaiming these digital tools, we transform the 'low-res' trash of compressed media and the 'hi-res' data of surveillance into a new kind of architectural literacy, one that does not just occupy the territory but actively deconstructs and reimagines the ecologies of the post-digital age.

Notes

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BIOs:

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