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Silodam typological iteration generated by Bing Image Creator. Image courtesy of Xavier Van Rooyen.

Xavier Van Rooyen (Université de Mons, TU Delft)

Open Digital Architecture Archives or the Infinite Metaphorical Iteration of Architecture

OPEN DIGITAL ARCHITECTURE ARCHIVES OR THE INFINITE TYPOLOGICAL ITERATION OF ARCHITECTURE

Digital archives raise the question of how to preserve them, display them or catalogue them. The question we would like to address here concerns the potential of digital archives to be integrated into an ideation process, enabling the creation of new architectural types based on archives of the past.

In a vision of an open society, the data represented by digital archives can from our point of view be more widely opened up to academics and practitioners alike, to increase their potential for use.

In the book *Copy Paste: Bad Ass Copy Guide*, the past is considered as ‘a vast archive on which we can and must build’¹. From our point of view, by opening up all digital archives contained in research centre, we can consider digital archives as an open gigantic typological catalogue unknown to all. Considering this possibility of open-source archives, data contained in research centre have the potential to be considered again and reinterpreted through a process of automation and the use of Artificial Intelligence made possible with the emergence of the second digital turn.

The Second Digital Turn and the Potential of Open-Source Archives

The use of computer-aided design has long been the subject of theorising, by Mario Carpo, Greg Lynn or Peter Eisenman. Mario Carpo has devoted a number of books to the subject, tracing its recent history back to the 1990s, at least as far as architecture is concerned. Following Carpo, the first digital age gave birth to a blob style, also known as the ‘style of the spline’² and CAD software were used to design a non-standard architecture.

During the second digital turn, data has become central in the automation process of designing architecture. Algorithm and data-driven architecture gave rise to ‘the second digital style, the style of data-affluent society and of a nouveau data-rich technology, [...] the style of the late 2010s’³.

- 1 Winy Maas, Felix Madrazo, *Copy Paste: The Badass Architectural Copy Guide* (Rotterdam: nai010, 2017).
- 2 Mario Carpo, *The Second Digital Turn. Design Beyond Intelligence*, (Cambridge, MA: The MIT Press, 2017), 4.
- 3 Mario Carpo, *The Second Digital Turn*, 56–57.

The second digital aspect was also a way to develop the possibility of creating a collaborative virtual network, where 'computer-based design and manufacturing is giving rise to new forms of digital artisanship, narrowing the Albertian divide between conceivers and makers. Likewise, the digitally enhanced horizontal integration of actors and agencies in the design and production process is already challenging the modern notion of the architect's full authorial control and intellectual ownership of the end product. New digital platforms for open-ended, interactive collaboration may beget endless design variations, revisions, or versions loss of design control and of authorial recognition, and even, in the most extreme cases, collective or anonymous results'⁴.

Such an open-source data network has been discussed between different architectural archives research centre and can, as such, can be used for digital archives access and be an 'open-ended, interactive' platform that can give the designers access to unknown architectural references that can be exploited into a data-driven design process.

Open-source data address issues of data privacy, intellectual property rights, and the quality control of shared digital architectural archives to ensure responsible and ethical use. It also questions limitations and challenges associated with opening up digital architectural archives. According to Carpo, this question of authorship is rooted in Leon Battista Alberti's drawings⁵: once he signed and annotated his plans, his copyright began to exist. Yet architectural projects have always been open to reinterpretation, since history is a vast field of investigation and precedents. Was this not the case when Rem Koolhaas distorted the plan of the German pavilion at the Barcelona International Exposition (1929) to fit the circular layout of the Triennale? Does Koolhaas reference his approach and then offer us a personal, discursive version in his collages for Casa Palestra in 1986? Whose intellectual property is it, then? For Koolhaas, the reference serves to support a critical and ambiguous interpretation 'whereas Koolhaas consciously and deliberately challenges moral values by celebrating athletic activity and sexual pleasure in an architectural icon of the fascist period'.⁶

Open archives can play the same role as Mies' plan in Koolhaas' work for academics and practitioners and as such will challenge 'the modern notion of the architect's full authorial control and intellectual ownership of the end product' to 'relinquish the legacy of the authorial privileges the design professions have so laboriously struggled to acquire over time'⁷.

4 Mario Carpo, *The Alphabet and the Algorithm* (Cambridge, MA: The MIT Press, 2011), 117–118.

5 Mario Carpo, *The Alphabet and the Algorithm*, 44.

6 Mathieu Berteloot, Véronique Patteeuw, "OMA's Collages. OMA. The First Decade", *OASE* 94 (2015), 67.

7 Mario Carpo, *The Second Digital Turn*, 142–143.

Anteriority of Architecture

Using history and archives into a design process refers to what Peter Eisenman called the anteriority of architecture.⁸ In the 1990s, the reference to this anteriority was not exhaustive in the American architect's work. It was essentially a question of capitalising on all the knowledge acquired by the architect through the analyses he carried out of Renaissance architects' projects (Alberti, Brunelleschi or Palladio) or the spatial analyses illustrated in his PhD-based on the works of Giuseppe Terragni. Open-source archives therefore represent a potential for greater comprehensiveness, and the capacity of computers to process data is far greater than the knowledge acquired through the research work of a single researcher.

In different internationally renown architectural offices, Rhinoceros and Grasshoper are often used to test different variations of way of assembling different typology for example. Algorithm and data-driven architecture enable 'a process of differentiation [that] can now be scripted, programmed, and to some extent designed'⁹. With the emergence of the artificial intelligence, offices such as Zaha Hadid Architects, led by Patrick Schumacher, use Dall-E or Midjourney to reinterpret, combine or merge their own archives, their own anteriority into an ideation process to test variability.¹⁰

As such, new technologies since the digital turn and more specifically Artificial Intelligence enrich architectural practice with the potential to create new typologies, new variations of types based on anteriority of architecture and digital archives such as MVRDV's, preserved at the NI. In order to conceptualise contemporary public buildings that 'requires developing new types of buildings and building elements'¹¹, AI tools can re-invent past structures and existing typologies, through research and design as well as research by design capitalising on digital archives as a vast resource of data and types. Online platforms such as DigitalFUTURES provide tutorials to help designers master Dall-E and Midjourney.¹² Of course, such use of digital archives in design process needs a critical methodology to develop innovative buildings. Moreover, by capitalising on certain types of archival documents, the research we present here was primarily aimed at discovering how to integrate image generators into a design process, a tool that some practicing architects have already seized upon. This paper explains the different steps of the exploration we made using different archives and image generator through the course of history and theory of architecture in UMONS (Belgium).

8 Robert Somol, *Peter Eisenman: Diagram Diaries* (London: Thames & Hudson, 1999), 37.

9 Mario Carpo, *The Alphabet and the Algorithm*, 7.

10 Patrick Schumacher, "AI and the Future of Design Roundtable Discussion, Digital FUTURES world", April 8th, 2023 [<https://www.youtube.com/watch?v=jjUb48f4Roc>].

11 TU Delft Public Building Group statement, <https://www.tudelft.nl/en/architecture-and-the-built-environment/about-the-faculty/departments/architecture/organisation/groups/public-building>.

12 See <https://digitalfutures.international/>.

AI DIGITAL ARCHIVES DATA-DRIVEN GENERATION

Following Mario Carpo, ‘thanks to data-driven Artificial Intelligence we can now mass-produce endless non-identical copies of any given set of archetypes or models. The GAN technique can produce similarities working the analytic way by abstracting one ideal archetype out of and common to many similar images– or, by reversing the process, generating many realistic images similar to their models; by applying the two processes sequentially, GAN can produce a new set of non-identical copies collectively similar to one or more original datasets’¹³.

As such, the course assessment was at first inspired by GAN technique. The first intention was, based on projects by MVRDV and the late Belgian organic architect Jacques Gillet, to test the typological recognition potential of common image generator tools, with the aim of shaping several variants of reference projects, to challenge the ability of artificial intelligence to create potential alternatives, just as Grasshoper and Rhino. Digital archives and unbuilt typology would as such, serve an unprecedented exploratory universe in the architectural design process.

Our first intuition was that using AI and digital archives in the design process can really become ‘a kind of combinatorial theory that allows given elements to be associated with each other in all possible ways, first abstractly, independently of their distinction, and then according to the distributive requirements of the different terms’¹⁴. The different results of this first exploratory phase did not meet this objective.

AI IMAGE GENERATOR POTENTIALITIES

Unlike Patrick Schumacher and Zaha Hadid’s office, we did not use realistic renderings to generate AI image, but architectural drawings and built projects pictures were used as an input to generate image and/or variations.

Firstly, we used pictures of Silodam as a first input and we defined a normal degree of influence for the final output. The different output we were able to generate were collected and put together to constitute a kind of typological catalogue.

Secondly, we digitised a significant percentage of Jacques Gillet’s archives preserved at the GAR architecture archives research centre in Liège, to exploit them for our AI exploration. In the archives, we discovered a lot of hand drawings of the Sculpture house, and some really impressive hand drawings made during different travels in Dordogne in France. These expressionist drawings contain a huge spatial potential that we wanted to use as input through AI re-interpretation.

13 Mario Carpo, *Beyond Digital: Design and Automation at the End of Modernity* (Cambridge, MA: The MIT Press, 2023), 122.

14 Leonardo Benevolo, *Storia dell’architettura moderna* (Rome: Laterza, 1964), Vol. 1, 79.

Both explorations did not offer any real alternatives to an architectural project. In fact, the images obtained are of course only two-dimensional, and cannot be used as a three-dimensional object. But what do these images represent? How can we exploit these images and archive plans, which in the final output, according to the prompt, deviate greatly from the original document?

The action of AI image generator is to generate ‘many realistic images similar to their models’¹⁵, but in fact, the resulting image operates a semantic shift similar to what Véronique Patteeuw associates with the collage process in the work of the Office for Metropolitan Architecture. For the researcher, ‘the action of collage – that of collecting, accumulating, piling up, selecting, cutting up and assembling in sequences heterogeneous elements, figurines and objects, in order to achieve a suggested reality – evokes new narratives, new dialogues and new temporalities. Combining motifs and pictorial fragments disconnected from their original meanings, collage doesn’t close off the imaginary, but opens it up. It does not seek to approximate reality, nor does it pretend to sublimate reality; it possesses a certain autonomy. Far from being a finished document, collage is a tool for initiating dialogue. As Finnish architect Juhani Pallasmaa points out, collage offers ‘archaeological density and a non-linear narrative through the juxtaposition of fragmented elements, derived from irreconcilable origins’¹⁶.

AI image generator does not generate a final document just like collages. Archaeological density in our exploration is made possible by using archives as an input. What is generated is much closer to a metaphor, a primary generator, in the words of Rosario Caballero-Rodriguez.¹⁷ The researcher tells us that metaphor in architecture represents knowledge, as does the anteriority of architecture. It helps the architect to think through a project and translate it into a form. Metaphor plays the role of a primary generator, which can be pinned down into four categories: denotation-exemplification, expression and mediated reference. Through denotation, metaphor describes, represents, and even imitates the world, but the world is reinvented through exemplification and expression. This reinterpretation, this expression-exemplification, is the basis of the experimentation carried out with the students, exploiting the tool embodied by image generators using artificial intelligence. What we were able to discover is that using archives in an ideation process as an input subject to variability due to the image generator tool, becomes, once the output has been obtained, a representational tool and generative of an architectural process, in the same way as collage, metaphor or sketch. It is representational, because it enables the project concept to be expressed, and generative, because in itself it contains the potential for spatial organisation, and the potential for action and transformation of the architectural reference. The final output is not a final document but a reality that is yet to come, a potential version of a vision, ‘a project of form’¹⁸.

15 Mario Carpo, *Beyond Digital*, 122.

16 Juhani Pallasmaa, “Hapticity and Time, Notes on Fragile Architecture”, *The Architectural Review* (May 2000), 80; Véronique Patteeuw, “Le collage dans l’oeuvre de l’OMA (1978–1989)”, in Xavier Van Rooyen, *Open Architecture* (Liège: Gar éditions, 2019), 247.

17 Rosario Caballero-Rodriguez, “From Design Generator to Rhetorical Device”, in Gerber Andri, Patterson Brent, *Metaphors in architecture and urbanism* (Bielefeld: transcript Verlag, 2013), 91.

18 Giulio Carlo Argan, *Sur le concept de typologie*, in *Projet et dessin, Art, architecture, urbanisme* (Paris: Editions de la Passion, 1993), 58.

In this way, Artificial Intelligence image generator and open source archives open up the potential of digital archives not only as a research or exhibition object, but as an immense database that can enable infinite typological iteration and it represents a possible use of Open architecture archives for the Future. Nevertheless, to overcome the limitations associated with authorship, to 'relinquish the legacy of the authorial privileges the design professions have so laboriously struggled to acquire over time the architectural profession simply has to accept that the design process of many architects is inevitably initiated from an architectural anteriority that is subject to reinterpretation', like in Winy Maas's publication *Copy Paste: Bad Ass Copy Guide*. In any case, we have the intuition that platforms such as Archdaily already disseminate a gigantic amount of architectural content that can be used and reinterpreted by other project authors and are moreover stored long-term on servers and therefore already accessible to all. Open architecture archives can play the same role in a near shared future.