

‘...the disruptive potential of AI...’

‘... acknowledging a political and social
dimension in its discourse ...’

Aurel von Richthofen, on tools, technology and society around the future of AI and architecture.

Artificial Intelligence & Architecture
Pavilion de l’Arsenal, Paris, France 27
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Reviewed by Aurel von Richthofen

Architecture has a long tradition of exhibitions that thematise its current state and evolution *vis-à-vis* new media, tools, technology, and society at large. More often than not such exhibitions proclaim a new area in architecture like the famous MoMA exhibitions on the international style or deconstructivism. The exhibition on ‘Artificial Intelligence & Architecture’ in Paris clearly wants to capitalise on the recent hype over the disruptive potential of Artificial Intelligence (AI) for society in

general, and the under-theorised aspects for architecture in particular. Here, Stanislas Chaillou, together with Bastien Dolla and Anders Kvåle, curated a twin exhibition on ‘Artificial Intelligence & Architecture’ as a physical exhibition in Paris held in early 2020 that was subsequently closed to the public during the pandemic, and as a virtual experience still available online.

The French architect Chaillou has successfully developed a narrative on what AI and architecture could achieve in the near future. Building on previous coding experiments and using state of the art AI tools, he offers a *tour d’horizon* on a central question of architecture, namely the genesis of architectural form.

Chaillou shows us how Generative Adversarial Networks (GANs) can be used to develop a large range of floor plans layouts and how Machine Learning (ML) can be used to recognise and classify facade elements or transfer ‘styles’ to make modern floor plans resemble baroque ones. He also shows how design optimisation techniques profit from AI and how many tedious aspects of the profession – like allocating spaces inside a building envelope in endless iterations – can be automated and streamlined. This is evident in so called ‘latent spaces’ of possible and plausible design alternatives that can be easily generated and then evaluated using AI tools. AI can also invoke ‘surrogate models’ by



1 Screenshot of the virtual exhibition ‘Artificial Intelligence & Architecture’.

learning from simple examples and transferring the interpretation to more complex ones to fast track otherwise lengthy simulation processes. In certain passages this demonstration of methods feels didactic, but sets the ground for a discussion and structures the conceptual plane of the exhibition. For instance, we learn how Christopher Alexander's pattern language can be revisited for an ontological approach to architecture, even though his descriptive method fell short in addressing the complexity of design back in his time. Here AI tools can help creating a dynamic update of Alexander's work with so-called Semantic Web Technologies. The message the exhibition seems to transmit is that the AI tools are available, relevant, and tameable, and that they offer new opportunities for architecture waiting to be seized. Despite the fact that architectural form genesis is foregrounded we can imagine how other spheres of architectural practice such as programme, mobility, ecology, energy, or engineering could benefit from AI tools as well. Yet, the disruptive potential of AI is deliberately downplayed. The fact that the use of AI is much more advanced in other design related industries, such as automotive, aerospace, robotics, drug discovery,

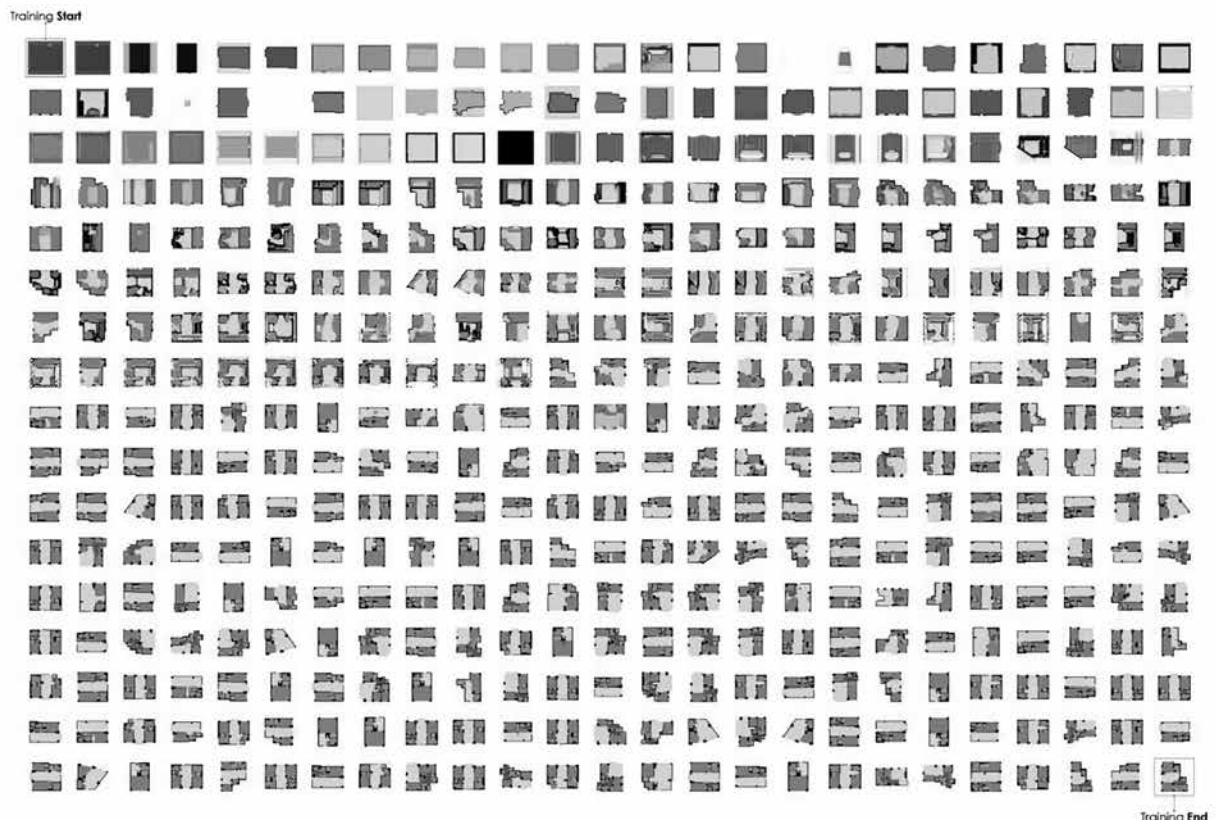
platform economies, and manufacturing is merely referenced in the exhibition. The concept of 'sustainability' is distinctly absent.

Systems and positions

An underlying question of the exhibition revolves around the essence of architectural design and creativity, namely how much machine assistance is acceptable to society and architects in this expanding cyber-physical context. The AI presented here is closer to so-called narrow AI, meaning task specific AI, and not general AI able to perform broader creative tasks. The exhibition flirts with the possibility of such general AI systems building upon the current narrow ones, leaving the audience to deliberate how far machine tools could – and should – be assisting human designers in their cognitive tasks. The spectator is also drawn into the fascination for AI as a toy that yields elements of surprise by revealing otherwise hidden relationships of architecture. The exhibition aims to shake up the foundations of the 'conventional' architectural practice apparently still held back by traded forms of knowledge production. This elegant and accessible presentation in itself is worth applause, as previous attempts to showcase computational tools often

oscillated between techno-fetishism and *naïveté*.

However, the exhibition falls short when it positions AI inside a meta-narrative of modernism in architecture. In a tour de force Chaillou invokes the canon of modern architecture that is neither necessary nor critical to the question of AI and architecture. Le Corbusier, Buckminster Fuller, and Patrick Schumacher stand for stages of architectural form generation that point from artistic to systemic to parametric. This lineage is loosely coupled with theoretical references to Christopher Alexander, Nicholas Negroponte, and Cedric Price to stress the argument. The spectator is lured into a narrative of causality starting from modularity, leading to computational design, to parametricism, and to AI in architecture. This historic framing is not just problematic for its slick linearity, but also because it brackets out controversies, alternatives, diversities, and inherent contradictions of architecture in dialogue with society. This is evident in current debates around AI and privacy, accountability, and transparency that inevitably link to architecture and its role in shaping not just abstract form, but in creating



2 ArchiGAN floorplan generator.

inhabited spaces and enabling societies. One does not need to invoke Lefebvre's concept of the production of space to see how a tool with some cognitive capacities such as AI is inherently political. Unfortunately, the exhibition further perpetuates the predominance of Western, male, and techno-complicit architecture that is twice problematic for its position within a reactionary and neoliberal context such as Schumacher's.

Experiences of digital space

The virtual tour takes us through a 3D version of the Pavilion de l'Arsenal space in Paris.

This virtual replica shows the vaulted glass and steel structure of the pavilion to the point of distraction; yet, this space is whitewashed, devoid of colours and textures. The spectator is invited to navigate the exhibition in clockwise manner, just as the physical exhibition was set up. Virtual bookmarks help to navigate towards the next exhibition panel, which can be first viewed in 3D and then clicked upon to be displayed fully on the screen. The navigation and orientation in this virtual exhibition is remarkably smooth and intuitive over the web, although the spectator is forced into the linear narrative deriving from the setting. The interactive possibilities of web presentation are also currently under utilised. There are hardly any cross-references or links reaching to other resources outside the context of the exhibition that were surely used to craft it in the first place. Text is the main medium of this exhibition supported by visuals such as architectural diagrams and videos of animations or historic films of computer technology. However, the exhibition does not allow users to create or connect social media profiles or to otherwise add content, and it is also not possible to try out the AI tools. This unfortunately renders the experience rather unidirectional and conventional.

The exhibition at the Pavilion de l'Arsenal is already polarising. Critique from the field is inevitable whenever a new tool and value system is proposed. Practitioners and academics in the 'parametric camp' will most likely rebel as AI has the potential to upset many mechanic approaches

to computational design.

The exhibition is likely to see applause from theoreticians and professionals already operating in the realm of semantics and Semantic Web Technologies. But these disciplinary rivalries are irrelevant in light of the societal and environmental challenges ahead. If architects want to contribute to a meaningful discussion on new media, tools, technology, and society around the future of AI and architecture, then they need to acknowledge a political and social dimension in their discourse. Perhaps this exhibition made this aspect just a bit clearer.

'Artificial Intelligence & Architecture' was held at the Pavilion de l'Arsenal, Paris, 27 February to 5 April 2020. A virtual exhibition was created in reaction to the pandemic, which can still be visited at <<http://stanislascchaillou.com/arsenal/vtour/tour.html>>

Illustration credits

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Competing interests

The author declares none.

Author's biography

Aurel von Richthofen is a researcher at the Singapore-ETH Centre, ETH Zurich's research centre in Singapore, and leads the Cities Knowledge Graph project using Semantic Web Technologies and AI for cities. The project is developed in collaboration with the Cambridge Centre for Advanced Research and Education in Singapore. Aurel holds Master's degrees in architecture from ETH Zurich and Princeton University, as well as a PhD in urbanism from TU Braunschweig.

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