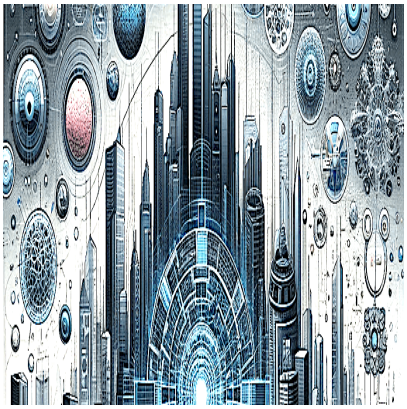

From CAD to AI

Description

The complex relationship between cybernetics and semiotics outlined in previous posts helps me at least identify major differences in thinking about cities, and the lack of comprehension by adherents to one with the other. In part itâ??s a distinction between a calculative approach to cities, and a more humanistic orientation, and by â??humanisticâ?• I mean one that pertains to the humanities. The distinction in part reflects my own journey through the fields of computers, digital media and AI.

Graphics takes hold

My early research, and that of colleagues, focussed on tools for design. We were steeped in the possibilities offered by computer-aided design (CAD). In the 1980s CAD was starting to take hold in architectural offices and schools. Computer scientist Ivan Sutherland demonstrated in 1963 that you could draw on a computer screen and visualise 3D models. It was soon apparent architects could print out plans, elevations, details and perspective renders.

Even in CADâ??s earliest conceptions, scholars and practitioners were thinking in terms of design-enhancing automation. Nicholas Negroponteâ??s *The Architecture Machine* published in 1970 tantalised practitioners with a prototype drawing system that offered text-based question and answer dialogue that would lead you through the process of designing a house.

The CAD record

In 1998, architectural researcher Bob Martens at the Vienna University of Technology and structural researcher Ziga Turk at the University of Ljubljana set up a cumulative index of publications on computer-aided architectural design, either relevant to design researchers or produced by them. See https://papers.cumincad.org.

Now there are over 900 publications (out of 12,300) listed on the theme of AI in architecture, the earliest records dating to the 1970s. I mention this to indicate that parallel to high profile researchers developing the techniques of large language models, neural networks, robotics and artificial intelligence we see a

well-documented record of researchers and practitioners in architecture, design, engineering and others engaged in the built environment applying the tools and techniques of AI to practical contexts, thereby broadening the investment of AI beyond computer science and cognitive science.

Knowledge-based design

For our part, in 1990, colleagues and I collated our own AI-based research as a book *Knowledge-based Design Systems* published by Addison Wesley. In that we applied rule-based and logic models of AI to the challenges presented by design in the built environment. Concurrently we were also dealing with the challenge at the time posed by neural network theory.

Our research was mainly on the side of so-called symbolic AI, as opposed to the theories of connectionism, i.e. neural networks of the kind that eventually bloomed into the highly successful large language models now emblematic of AI. Some of us did however experiment with associative neural networks in the 1990s, and I referred to these in previous posts.

The post-modern turn

The early 1990s also saw the influence of Terry Winogradâ??s book (with Fernando Flores) *Understanding Computers and Cognition* take hold in certain sectors of the AI in design community. In his earlier work, Winograd had implemented the idea of instructing a robotic device to move blocks around a space following logical spatial rules, and in response to instructions delivered in something like natural language. But *Understanding Computers and Cognition* departed from a mechanistic, computational approach to language and introduced concepts from philosophy that helped explain the difficulties, if not the impossibility, of such a project, as well as alternative avenues for research.

This â??postmodern turnâ?• introduced CAD and interaction designers to philosophical phenomenologists such as Martin Heidegger, Hans-Georg Gadamer and Maurice [corrected] Merleau-Ponty. These scholars drew attention to the physical, embodied nature of thought and intelligence, and the roles of language in establishing our â??being in the world.â?•

An important book by philosopher Hubert Dreyfus positioned this work within the problematics of computers and AI: *Being-in-the-World: A Commentary on Heideggerâ??s Being and Time Division I*.

For my part, I also fell under the thrall of the renaissance in architectural theory, with its newly-found, broad-ranging, and distinctly humanities-based orientation. My colleague and Asian scholar Adrian Snodgrass was influential here, along with the growing realisation that a language-based approach provided greater force to fire up architecture students than a purely calculative approach, and proved to be most relevant in design studio teaching. In 1995 I published a book *Designing Information Technology in the Postmodern Age* with MIT Press, and Snodgrass and I collated our understandings from hermeneutics, philosophy and design in our book *Interpretation in Architecture: Design as a Way of Thinking* with Routledge.

Since the 1990s, the relevance of computing has burgeoned as impetus for so much innovation in architecture and design teaching and practice, with architects, urbanists and designers contributing to critique and development, and provide a testing ground and context for AI theories and ideas. As

indicated in the *RIBA AI Report* published in 2024, architectural practices continue to be animated by the possibilities of AI.

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Note

- Featured image: I prompted Chat GPT â??Can you create an image that gives expression to this content. Please donâ??t show human forms in this image.â?• Chat GPT replied: The image created aims to encapsulate the evolution of architectural design as itâ??s been influenced by technology. It transitions from the early utilizations of computer-aided design (CAD) to the profound integration of artificial intelligence (AI) within the urban landscape. This abstract representation is devoid of human forms, focusing on the conceptual interplay between technology, architecture, and philosophical thought in shaping the digital ageâ??s urban environment.â?• I lightened the image and cropped it to fit the banner format.

Category

1. Artificial Intelligence

Tags

1. architecture
2. computer-aided design
3. knowledge-based systems

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March 16, 2024
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