



## Urban AI and cybernetics

### Description

If you want to investigate how two entities relate to one another then it can be helpful to introduce a third that is somehow relevant to both. Architecture and cookery can be conjoined via the concept of *taste* – that kind of thing.

In my blog posts to date I present *language* as providing a ligament that connects AI with cities. After all, large language models (LLMs) provide a high-profile demonstration that machines can replicate something akin to human intelligence. In the earliest days of computers, Alan Turing used conversational acuity as the benchmark for intelligence – the so-called [Turing Test](#) for intelligence.

Elsewhere I have attempted to demonstrate that language is also key to understanding cities. (See post: [City stories](#).) Cities are negotiated, described, interpreted, analysed and even created through language, i.e. via communication, conversation, dialogue, narrative, and even just isolated words. There's an urban semiotics in play. Hence, my insistence that language (its theories of meaning, pragmatics, hermeneutics) provides one of the strongest channels for examining the complex relationships between cities and automated intelligence – and claims for urban AI (UAI).

## Urban cybernetics

But some scholars prefer other avenues for exploring urban AI. Some have focussed on cybernetics as the theoretical ligament that connects AI to cities. For example, urban theorist Federico Cugurullo and colleagues situate urban AI historically within the development of scientific methods applied to cities, in particular developments in cybernetics.

Thus, today UAIs are machines capable of interacting with their environment and regulating their behaviour in relation to pre-defined goals, in line with the ideals theorized by cyberneticians in the past century. In fact, some scholars (urbanists in particular) have noted a direct connection between the application of AIs in cities and the history of cybernetics [5].

Rather than AI-based conversational acuity, this cybernetic avenue of inquiry is populated by autonomous vehicles, robotics, automated sensors and actuators, the control of transportation systems, security, monitoring, decision support systems, big data and other entailments of the “smart city” as prime exemplars of UAI in action. The operative terms of cybernetics are *inputs and outputs, control, signals, feedback, entropy and stability*, rather than the linguistic orientation that emphasises *meaning, understanding, interpretation and story-telling*.

Semiotics and cybernetics have intersected in various ways. Winfried N<sup>ä</sup>th considers both in his extensive survey: *The Handbook of Semiotics*. Cybernetics would seek to subsume language and communication within its own explanatory terms of inputs and outputs, control, signals, feedback, entropy and stability.

I included “feedback” in this list of cybernetic attributes. One of the theoretical innovations claimed by cybernetics was the incorporation of feedback loops into its models. An organism or machine receives inputs from its environment, and then acts in response, which in turn changes the environment, and prompts further responses. Other insights develop from this idea of close coupling between organism (or machine) and its environment. N<sup>ä</sup>th recognises the value of this basic insight.

“In the course of the development from linear to circular models, communication theory has overcome the misleading idea of communication as an almost undisturbed flow of signals from a source to a destination” [178].

But semioticians are critical of a cybernetic approach to language: “the improvements introduced by cybernetics and systems theory have attracted new criticism” [178].

At issue is the reception of the signal flows. N<sup>ä</sup>th summarises the objections to a cybernetic framing of language, suggesting that it diminishes the role of the person or entity receiving the signal.

Cybernetics implies “a process of optimization, efficiency, and the goal of congruence between sender and receiver” [178]. His objection pertains to the lack of a theory about the receiver of a communication. For the semiotician on the other hand, the receiver is also an *interpreter* with their own framing that in turn influences the message, and the context of the communication. (See post: [Hermeneutics and logic](#).)

Cybernetics frames its own challenges, e.g. how to deal with multiple cybernetic agents, each with their own interactions with the environment. For Cugurullo: “The search for a radical, open cybernetics that is attentive to the dynamic connection between different intelligences instead of their forced harmonisation is still open” [14].

## Are LLMs cybernetic systems?

Certainly, the cybernetician could describe artificial neural networks that underpin LLMs in terms of inputs and outputs, control, signals, feedback, entropy and stability. See post: [Just one neuron](#). Cybernetics lays claim to any operation or process at some level of operation.

On the other hand, the semiotician could assert that language underlies any process. Interpretation is everywhere and in everything, including in the design and application of scientific procedures and the

narratives of cybernetics.

Rather than argue the case, I am content for the time being to see cybernetics and semiotics as providing two different framings, each with their own set of problematics. Each puts a different focus on the city, its challenges, opportunities, and how AI intervenes.

For my purposes, language in its many facets provides the ligament joining AI to the city. This linguistic turn pays off by admitting narrative, meaning, poetics, imagination, invention and [dissensus](#) into the urban conversation.

## Bibliography

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## Category

1. Artificial Intelligence

## Tags

1. cybernetics
2. hermeneutics
3. UAI
4. urban AI

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