



PlanAIr

Urban Artificial Intelligence: Approaches, Tools, Opportunities and Challenges

Edited by Camilla Perrone, Giulia Guadagnoli, Stefano Borgo

Forty years after the publication of “Gaia”, which proposed the concept of Earth as a living organism capable of self-regulation, James Lovelock published “Novacene”, a work that addresses the significant challenges of contemporary life, namely our relationship with intelligent machines (and Artificial Intelligence in particular) and the future of the planet. Novacene, the era that follows the Anthropocene, is a time when technology surpasses human control due to the rapid acceleration of “reasoning” techniques: “The Novacene, like the Anthropocene, pertains to design (engineering). The critical transition that initiated the Novacene was, in my view, the necessity to utilise computers to create and design other computers” (2020, 83). Lovelock explores a potential future focused on supporting Gaia. Unlike much of the scientific and the science fiction literature that theorizes the supremacy of machines, he proposes an alliance—a special form of interaction—between humans and living beings, the natural world and the artificial world, as well as social intelligence and artificial intelligence. This dynamical relationship finds its fullest expression in cities.

Cities stand as the most prominent evidence and inheritance of the Anthropocene. They are intricate systems that have garnered significant interest from the science of complexity. Sociologists Ash Amin and Nigel Thrift, in their work “Seeing Like a City,” describe cities as combinatorial machines, characterised by a generative force primarily shaped by the nature and composition of the sociotechnical systems that provide resources, information, and intelligence. These systems facilitate connectivity and circulation, linking humans and non-humans while enhancing outcomes and resonances. Thus, cities, according to a renewed and extended notion of the urban, function as systems for producing and reproducing both social and artificial intelligence. They intertwine various assemblages, each with its own agency, technologies, infrastructures, institutions, bodies, symbols, and distinct “moorings and motilities.” Furthermore, cities are hubs of creativity and focal points for democracy and revolution. For architects, designers, and planners, cities represent promising territories for planning, co-production, and experimentation, as well as for exploring the possibilities inherent in urban life.

With the rise of Artificial Intelligence (AI), cities – the de facto protagonist of Novacene – have catalysed a unique area of study termed "urban AI" by Michael Batty. Batty defines AI as an effort to simulate and replicate the complexity of human thought, including its creative and problem-solving abilities. This aspiration is associated with what was later termed "strong AI." The term "weak AI" emerged in the 1970s due to the challenges and risks related to the former concept. Weak AI focuses on developing problem-solving systems for specific tasks, such as navigation in robotics or forecasting in meteorology, rather than attempting to replicate genuine human cognition. In urban studies, an example of weak AI is a system that can predict how traffic will evolve in the next hour based on historical and actual data only, without mimicking how humans would reason about the situation. Today, urban AI falls primarily into this category. The focus, Batty writes, has been to use AI to explore patterns of spatial behaviour in cities, rather than to develop new methods for creating better cities.

Beside these uses of AI for optimisation issues, we should reflect on whether it is possible to exploit AI as a foundation for future studies and new developments in urban AI. Following Batty's perspective, while AI applied to urban contexts offers significant potential, spanning multiple dimensions and various aspects of urban areas, there is a need to classify AI methods coherently and to recognise their applicability beyond simple optimisation issues. Furthermore, the implications of AI on fairness, ethics, transparency, and efficiency deserve better attention and awareness. This complexity creates a rich and stimulating area for reflection, which is being explored in the context of cognitive science and conceptual modelling, and new possibilities for technology applications in urban studies. The conceptual categorisation that has emerged in the latter years divides AI into three approaches:

1. The cognitive approach, defined by the use of models and reasoning methods that recall those used by humans as rational agents.
2. The data-driven approach, characterised by machines' ability to autonomously learn from data, which has been extensively tested in today's urban AI applications.
3. The hybrid approach, which seeks to integrate elements from both the cognitive and data-driven approaches.

This framework provides a clearer starting point for discussing the diverse aims and applications of AI in urban settings.

PlanAIr aims to stimulate a debate on these issues across scholars and experts engaging in the domain of AI applied to cities, or grappling with the challenges and problems that the introduction of AI in cities generates. Within this view, PlanAIr welcomes works presenting and discussing the potentiality of developing AI for cities, and the consequences of using AI on the relationship between the city and society, on the functioning of socio-technical systems, and on the relationship between natural and artificial as well as human and non-human animals, and the variety of multi-agent interactions that are intrinsic to cities.

This issue of *Contesti* is open to theoretical, methodological and descriptive contributions (case studies, approaches, territorial policies) on the following topics (non-exhaustive):

Approaches

- Approaches and experiments in the field of AI applied to cities
- Planning and AI
- The emergence and evolution of urban AI
- Urban ontology and AI

Tools and practices

- AI in planning
- Data-driven Urban Intelligence (big data, data analytics, semantic computing, etc.): digital twins, urban control rooms, etc.
- Plans and projects supported or produced with AI
- Urban policies and AI
- The perspectives of Italian, European (see, for example, EU AI Act), and other international institutions regarding AI in urban settings: practices, challenges, issues, and limitations.

Ethics, opportunities and challenges

- Limits and opportunities presented by various approaches to AI for research on cities, service and infrastructure management, or urban and territorial design/planning.

- What ethics exist between utopia and dystopia for the post-human?
- What narrative/rhetoric accompanies the digital transformation?

The issue is co-edited by the Critical Planning and Design Laboratory of the University of Florence (Camilla Perrone chair, Giulia Guadagnoli) and the Laboratory for Applied Ontology (LOA) – Institute of Cognitive Sciences and Technologies (ISTC-CNR) (Stefano Borgo, chair).

INFO

The call is open until **August 30th, 2025**.

To submit your full paper, please go to our submission platform:

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Registration and login as Author with the CONTESTI system is required to submit and follow the submission process online. Later, the account is necessary for following the status of your submission.

The proposals have to be unpublished and written in Italian, English, French or Spanish; the article length has to be **between 4000 and 7.000 words**, including spaces, title, authors, abstract, keywords, captions and references.

Please pay attention to how to ensure a **Double Blind Review** when submitting your paper.

The proposals can include a maximum of 10 pictures with good definition (at least 300 dpi/inch and 25 cm the smallest side) free from publishing obligations or accompanied with the specific permission.

The selected papers will be published in the thematic section of the 2|2025 issue of CONTESTI.