Building the cognitive city of the future: How Agentic AI will transform the way we live

Urban living is undergoing generational transformation via rapid advancements in artificial intelligence. From conventional cities we know now, to the smart cities of the near future, AI will take our urban centres into a future that will fundamentally change the way we experience life.

Temps de lecture : minute

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Our cities are failing in many ways; streets are congested, air pollution is threatening public health, and energy waste is straining our resources and our wallets. Urban systems operate reactively, responding to problems only after they occur with city managers constantly playing catch up. Traffic management attempts to solve congestion after it has formed and only tries to correct pollution levels once they have already reached dangerous levels. Not to mention energy grids, only correcting for demand after a black out has occurred. It’s clear, we need a more proactive, intelligent approach.

Rise of smart cities

Smart cities use Information and Communication Technologies (ICT) and the Internet of Things (IoT) to integrate information collected in the process of managing a city, and then act upon this information in a way that leads to improvement of the quality and performance of urban services. Smart cities do however face some challenges. Existing city systems often work in silos, traffic management systems can’t share data

with the air quality monitoring system, even though the two are significantly correlated. This lack of integration hinders the possibility of building truly transformative urban solutions.

Can cognitive cities become a reality?

Two key technology frameworks have emerged in the last 6 months that opened my eyes to what I would describe as a ‘killer use case’ for AI that can accelerate the realisation of cognitive cities: Agentic AI and the Internet of Agents (IoA).

Agentic Artificial Intelligence (Agentic AI) was named by *Gartner* as a top strategic technology trend for 2025 and by *Forrester* as top emerging technology in 2024. It refers to an Artificial Intelligence system that has the ability to act autonomously and make decisions with very little supervision - if any- from humans. These systems are proactive, and learn from experience. An AI agent within an Agentic AI framework can understand its environment, plan, learn, reason and more importantly, take actions autonomously.

It will only be possible to reach the full potential of cognitive cities if we have seamless collaboration between AI agents across heterogeneous environments. That’s where the Internet of Agents (IoA) concept comes into play to solve the dilemma cities face today - siloed infrastructures, systems, networks and data.

Introduced first in a ground breaking paper called “ *Internet Of Agents: Weaving A Web Of Heterogeneous Agents For Collaborative Intelligence*”, the Internet of Agents concept describes a network where various AI agents work together seamlessly across heterogeneous environments. The magic is not just about connecting these agents, but rather about making those agents understand the capabilities of each other, share tasks, adapt to their environments, and learn from each other.

The messaging framework of the IoA is at the heart of this concept. Heterogeneous agents can be built on totally different architectures and can be specialised in performing different tasks, yet still effectively communicate with and learn from each other. This creates a universal language and protocol for AI agents to communicate with each other and collaborate, even though they are built on different architectures and have different roles to perform.

Cognitive cities in action

To understand the transformative potential of Agentic AI and IoA within the context of a cognitive city, let’s explore how common urban challenges could be addressed in the future.

Managing traffic and roads

A Traffic Management Agent, driven by Agentic AI, does more than fine tune signal timings. Because the IoA framework enables constant communications with other agents, the Traffic Agent is constantly adjusting traffic light patterns, suggesting alternate routes to navigation apps, and coordinating with public transportation authorities to avoid congestion before it happens. When an accident happens, the Emergency Services Agent collaborates with the Traffic Agent to route emergency response.

Optimising energy consumption

The Energy Management Agent in a cognitive city anticipates demand spikes days in advance by maintaining constant dialogue with other agents through the IoA. In a forecasted heat wave, it works with the Building Management Agent to pre-cool structures gradually during off-peak hours. It could also work with the Traffic Agent to encourage electric vehicle charging at optimal times, or to kickoff energy saving challenges

through the city app.

Pandemic response

Cognitive cities are far more resilient to pandemics thanks to Agentic AI and IoA. When the Health Management Agent (constantly analysing data from multiple sources) spots unusual illness reports from hospitals and a surge in certain medicine purchases long before traditional systems notice, it immediately alerts other relevant agents via IoA framework. The Public Information Agent launches awareness campaigns and the Transportation Agent begins to ban travel from and into impacted zones. The Urban Planning Agent looks at the area that needs to be quarantined and initially declares the area as such, along with letting the Infrastructure Agent know to get ready for the situation.

Natural disaster management

In disasters such as floods or hurricanes cognitive cities would be well managed by utilising the IoA, the Weather & Environmental Agents. These would work together, predicting potential flood zones or storm paths days in advance with unmatched accuracy. When these two agents detect a high risk scenario, they use the IoA network to trigger a series of responses. While the Transportation agent and Emergency Response agent jointly plan evacuation routes, the Infrastructure Agent deploys flood barriers to protect assets. All across the crisis, damage assessment, insurance claims and recovery plans are managed by The Economic Agent.

The future of urban life is limitless thanks to the promise and rise of cognitive cities. Through the use of Agentic AI, as well as the Internet of Agents, cities will shift from being reactive to preventing issues before they occur. From solving traffic congestion and energy consumption, disaster and health emergencies, and augmentation of the overall quality

of life, there are few obstacles that a cognitive city cannot prevent. There are obstacles to fuller digital urban intelligence, but there is amazing potential for cities that are both more intelligent and more accommodating to their citizens for generations to come.

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