



# AI for Good in Smart Cities

Whitepaper

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# Introduction

A lot of the discussion around AI and the transformative impact that it's having on society is connected to generative AI and technologies designed to create code, text, images and videos with just a few prompts from the user.

This is without a doubt a useful technology, but just touches the surface of what can be achieved with AI. Another application of AI offers a potentially transformative opportunity for urban environments by revolutionising the way cities function and enhancing the quality of life for their inhabitants. The integration of AI into smart city initiatives is not just a technological upgrade but a holistic approach to addressing urban challenges.

This white paper explores the potential of AI for good within the framework of smart cities, with a specific focus on SenSen's Live Awareness AI. It outlines how AI can enhance public safety, optimise traffic flow, and promote sustainable urban practices, ultimately leading to smarter and more liveable cities.

# What is meant by “AI for Good”?

“AI for Good” refers to the application of artificial intelligence to address societal challenges and improve human well-being.

This concept emphasises the positive impact AI can have when used ethically and responsibly, enhancing various aspects of daily life while safeguarding privacy and individual rights. AI for Good as a concept can encompass a range of applications, from healthcare and education to environmental sustainability and urban development.

Ensuring that AI is only leveraged in the context of AI for Good is a major concern of societies and regulators. The first major, comprehensive legal framework for AI – the AI Act, adopted by the European Parliament in March 2024 – was largely focused on enforcing an AI for Good approach, categorising applications of AI based on the potential risk that they presented to citizen’s lives:

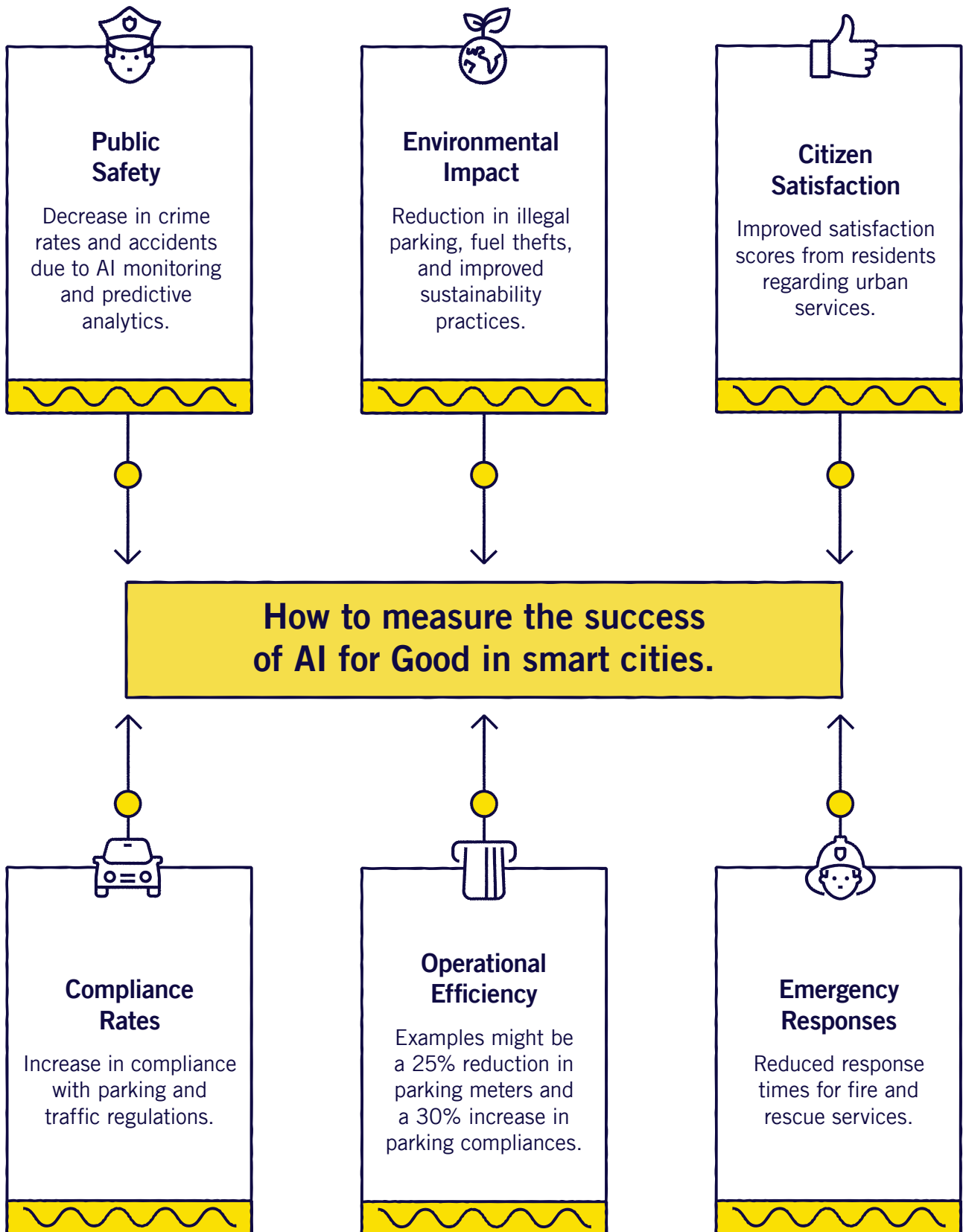
- **Unacceptable Risk:** Certain AI practices are considered to be a clear threat to fundamental rights and are prohibited. The respective list in the AI Act includes AI systems that manipulate human behaviour or exploit individuals’ vulnerabilities (e.g., age or disability) with the objective or the effect of distorting their behaviour. Other examples of prohibited AI include biometric systems, such as emotion recognition systems in the workplace or real-time categorisation of individuals.
- **High Risk:** AI systems identified as high-risk will be required to comply with strict requirements, including risk-mitigation systems, high-quality data sets, logging of activity, detailed documentation, clear user information, human oversight, and a high level of robustness, accuracy and cybersecurity. Examples of high-risk AI systems include critical infrastructures, such as energy and transport; medical devices; and systems that determine access to educational institutions or jobs.

- **Limited Risk:** Providers must ensure that AI systems intended to directly interact with natural persons, such as chatbots, are designed and developed in such a way that individuals are informed that they are interacting with an AI system. Typically, deployers of AI systems that generate or manipulate deepfakes must disclose that the content has been artificially generated or manipulated.
- **Minimal Risk:** There are no restrictions to minimal-risk AI systems, such as AI-enabled video games or spam filters. Companies may, however, commit to voluntary codes of conduct.

Other regulators around the world will likely follow suit based on the precedent provided by the EU. Applications of AI in smart cities will need to ensure that they comply with these AI for Good principles.

In the context of smart cities, AI for Good involves leveraging technology to create safer, more efficient, and more sustainable urban environments, while meeting those regulatory expectations and requirements. This includes using AI to monitor and manage city infrastructure, reduce crime, improve traffic conditions, and support environmental conservation efforts. The goal is to harness the power of AI to create cities that are not only technologically advanced but also equitable and inclusive, ensuring that all residents benefit from these innovations.







# AI for Good's role in Smart Cities

AI plays a crucial role in smart cities by providing advanced tools and solutions that address the full gamut of urban challenges. These technologies enable cities to become more responsive and adaptable to the needs of their residents, enhancing overall quality of life. See key areas where AI can make a significant impact overleaf.



### Public Safety

AI technologies can vastly improve public safety by providing real-time data and predictive analytics. Research suggests that the right application of AI could help a city reduce crime by as much as 30 to 40 per cent, and if crime should occur emergency services could respond 20-35 per cent faster.

In application, AI-powered surveillance systems can monitor public spaces, detecting unusual activities and potential threats, allowing law enforcement to respond promptly. Additionally, AI can help in disaster management by predicting natural disasters and facilitating efficient emergency response.

### Transportation and Mobility

Another application of AI in smart cities is to optimise traffic flow and reduce congestion through intelligent traffic management systems. By analysing data from various sources, AI can predict traffic patterns and adjust traffic signals in real time to ensure smooth vehicle movement. Moreover, AI can improve public transportation by providing accurate arrival times and optimising routes based on passenger demand.

According to a report by McKinsey, cities that have implemented AI-based traffic management systems have seen a 30 per cent reduction in traffic congestion and a 15 per cent improvement in travel times.

### Quality of Life

Finally, in a general sense, AI enhances the quality of life by providing smart solutions for various urban issues. For example, AI can improve accessibility for people with disabilities by providing real-time information on accessible routes and facilities. Additionally, AI can enhance public services by automating administrative tasks and providing personalised services to residents.

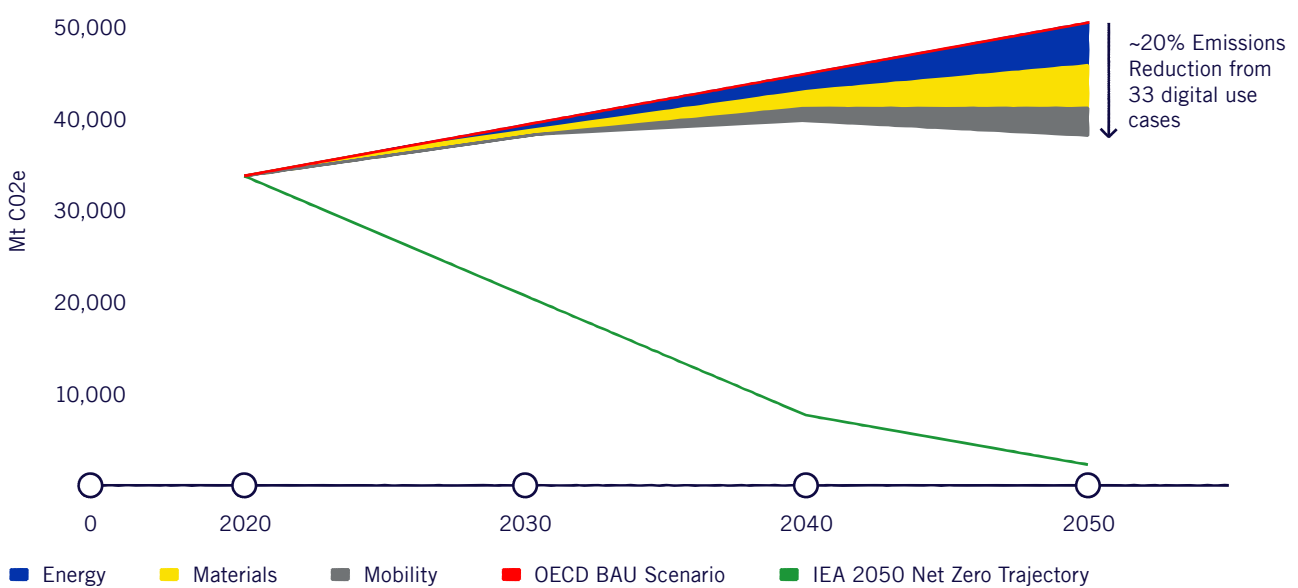
Research by S&P Global shows that governments in particular are motivated to use AI to improve citizen experiences, with 44% saying that was a primary driver for smart city initiatives, ahead of improving city services (42%).

### Environmental Sustainability

AI can support sustainable urban practices by monitoring environmental conditions and optimising resource usage. For instance, AI can manage waste collection efficiently, reducing the environmental impact. Additionally, AI can monitor air quality and predict pollution levels, enabling cities to take proactive measures to improve air quality.

What AI can deliver in this area is not marginal. As a report by the World Economic Forum highlights, AI-enabled digital solutions in smart cities can reduce global emissions by as much as 20%:

Digital solutions can accelerate net zero trajectories in high emission industries



Source: Accenture analysis (2022); IEA Net Zero Emissions by 2050 Scenario (2021); OECD Environmental Outlook to 2050 (2012); various WEF, UN, U.S. Government and enterprise data. Copyright © 2022 Accenture. All rights reserved.

# Why AI for good needs to be the central priority for Smart City projects

**In June 2024, an in-depth article by the New York Times highlighted the impact that AI can have in smart city projects when AI for Good principles are not central to the deployment and use of the solutions.**

The article highlighted how Detroit had become the first person known to be wrongfully arrested based on faulty facial recognition, and how he was followed by a woman who was charged with carjacking when she was eight months pregnant.

To mitigate against the risk of this happening in the future, the city redefined how it used its AI systems in law enforcement processes, so that AI recognition was no longer the only evidence that was used in making arrests, and Detroit now has the “strongest policy in the nation.”

The ethical implications of AI deployment in public safety and surveillance are profound. Facial recognition technology, while powerful, has repeatedly demonstrated biases, particularly against people of colour. These biases can lead to severe consequences, and was the underlying factor in the wrongful arrests in Detroit. Implementing AI for Good best practices ensures that these technologies are designed with fairness and equity in mind, reducing the risk of discriminatory outcomes. It also mandates regular audits and assessments to identify and mitigate any biases that may arise during their use.

Secondly, transparency and accountability are paramount in maintaining public trust in AI systems. The Detroit Police Department’s new policies, developed in response to the wrongful arrests, illustrate a move towards greater accountability. However, these measures are reactive rather than proactive. By embedding AI for Good principles from the outset, smart city projects can ensure that transparency is built into the system. This involves clear documentation of AI decision-making processes, open communication with the public about how and why AI is used, and robust mechanisms for individuals to contest and rectify errors made by AI systems.

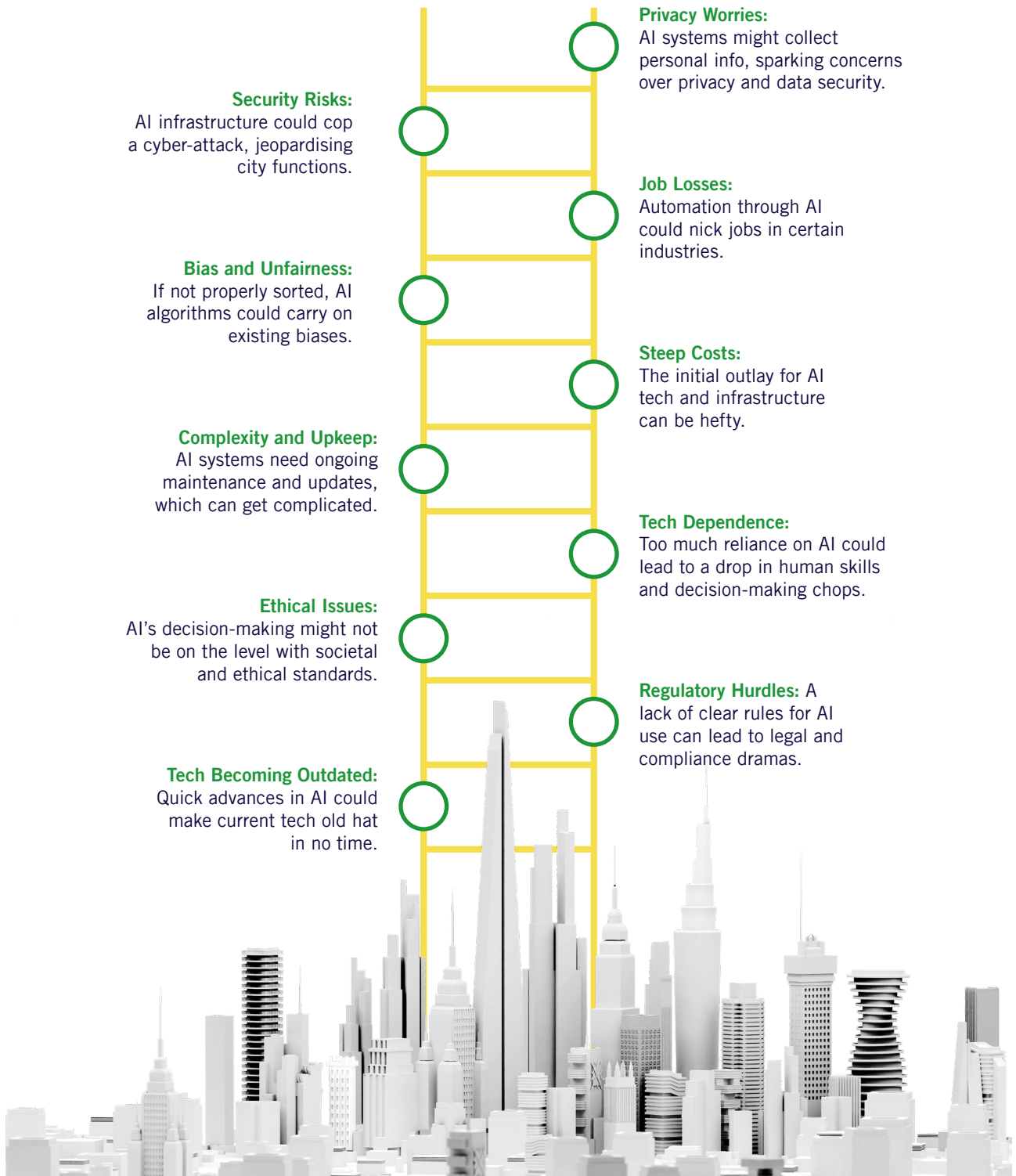


Moreover, prioritising AI for Good fosters innovation that benefits society as a whole. When AI projects are guided by principles that emphasise human rights, privacy, and social welfare, the resulting technologies are more likely to be accepted and trusted by the public. This trust is essential for the widespread adoption and effective implementation of smart city initiatives. For instance, AI systems designed with privacy safeguards can alleviate concerns about pervasive surveillance and encourage community support for technologies that enhance safety and efficiency without compromising individual freedoms.

Lastly, ensuring AI for Good is central to smart city AI projects aligns these initiatives with broader global efforts towards sustainable and inclusive development. Organisations like the United Nations have highlighted the role of AI in achieving the Sustainable Development Goals (SDGs), emphasising that AI should be leveraged to address social challenges and improve quality of life. By committing to AI for Good, smart city projects can contribute to these global objectives, creating urban environments that are not only technologically advanced but also socially and ethically responsible.



# Ladder of risk for AI for Good to overcome



# How AI surveillance solved one city's heavy vehicle compliance woes

One Australian council was facing an issue with one particular stretch of road that was regularly being used by trucks over the weight restrictions. This resulted in frequent complaints and a laborious process to manage it. Furthermore, the council knew the problem was probably larger than they were able to manage – in 2020-2021, it was able to send 56 manually-registered fines for breaches related to load limits.

In April 2022, the council approached SenSen to deploy its leading SenFORCE Fixed solution on a three-month trial basis.

SenFORCE Fixed is a specifically tailored application of SenSen's Live Awareness camera system and technology. Using AI, it only detects trucks, and after recognising one of them, creates an alert. If the truck passes a second camera within a predetermined time, it could be deduced that it didn't stop to make a delivery.

Once qualified this way, the alert was created in SenBOS for the issuing office to manually review, and after determining that the truck was in breach of compliance could send a notice to the owner of the vehicle to provide information to issue the fine.

After just a three-month trial, the solution so effective that the community along the road requested that the system be redeployed. In total, the number of heavy vehicle complaints dropped from 286 in 2020-2021 to 160.

It was also cost positive. Thanks to the system, the number of breaches detected and fined increased to 506 penalty notices and \$752,539 in fines issued. This more than supported the cost of maintaining the roads, which the council had previously paid \$18,258 after damage and degradation.






## How Live Awareness supports AI for Good

Live Awareness AI, developed by SenSen, is an advanced AI technology designed to provide real-time situational awareness in urban environments. It integrates data from various sensors, cameras, and other IoT devices to create a comprehensive and dynamic picture of city activities. This technology enables city authorities to monitor and manage urban operations more effectively, ensuring safety, efficiency, and sustainability.




# Key features of Live Awareness AI




**Real-Time Data Integration**

Live Awareness AI collects and processes data from multiple sources in real-time, providing an up-to-date view of the city.




**Predictive Analytics**

By analysing historical and current data, Live Awareness AI can predict future trends and potential issues, enabling proactive management.



**Automated Response**

The system can automate responses to certain situations, such as adjusting traffic signals to alleviate congestion or alerting authorities to potential security threats.



**Privacy Preservation**

Live Awareness AI is designed with robust privacy measures to ensure that personal data is protected and used ethically, helping smart cities deliver on their AI for Good obligations.



# Benefits of Live Awareness AI

**Live Awareness AI offers numerous benefits for smart cities, including enhanced public safety, improved traffic management, and better resource allocation. By providing real-time insights and predictive analytics, it enables city authorities to make informed decisions and respond swiftly to emerging issues.**

One city in North America was able to derive these benefits after employing AI technology for detecting homeless encampments – a potentially sensitive topic, but a challenge that the city was determined to find a positive and human-focused outcome to.

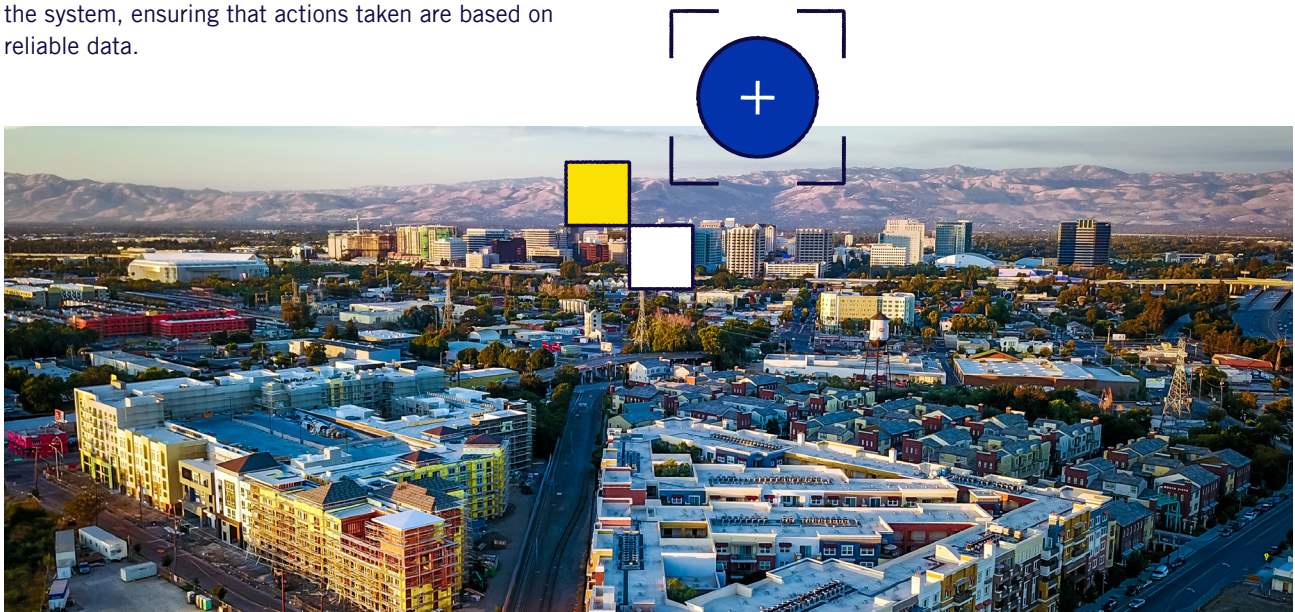
One key step for the city was leveraging SenSen AI technology to significantly improve the accuracy of identifying lived-in vehicles, versus cars that are simply parked. The ability to accurately detect lived-in vehicles allowed for extreme accuracy has subsequently allowed for better-targeted and more efficient interventions, ensuring that resources are directed where they are most needed.

In other words, the city's ability to send outreach workers to specific locations based on AI-generated data ensures that interventions are timely and relevant. This proactive approach can prevent the growth of larger encampments, addressing issues before they escalate. Furthermore, the transparency in reporting and the inclusion of optical character recognition for license plates enhance the traceability and accountability of the system, ensuring that actions taken are based on reliable data.

However, a key aspect of SenSen AI's implementation is the focus on preserving the privacy of individuals as well. The system's design includes blurring faces and license plates to protect personal identities, addressing concerns about surveillance and privacy infringement. By adhering to strict data use policies that prevent the active monitoring of footage for law enforcement purposes, the project aligns with ethical standards and prioritises the welfare of the unhoused population.

This ethical framework has meant that the city has been able to leverage the technology for the purposes of supporting, rather than penalising, vulnerable individuals. The emphasis on privacy also fosters public trust, essential for the successful deployment of AI technologies in sensitive contexts.

So, while there are concerns about the potential use of AI for punitive measures, SenSen AI's focus on detection rather than enforcement aims to mitigate these issues. The goal is to provide services and support to the unhoused population rather than merely clearing encampments. And by prioritising the welfare of the unhoused population and maintaining a focus on ethical standards, SenSen AI provides a valuable model for any city looking to implement AI-driven solutions for social good.



# How AI Supports Smart Cities





# How Live Awareness AI is supporting Smart Cities today

## Enhancing Public Safety

Live Awareness AI significantly boosts public safety by providing continuous monitoring and real-time alerts. This technology can detect and analyse unusual activities, enabling law enforcement to respond quickly to potential threats. For instance, it can identify suspicious behaviour in public spaces or detect unattended packages, alerting authorities to investigate further.

## Optimising Traffic Flow

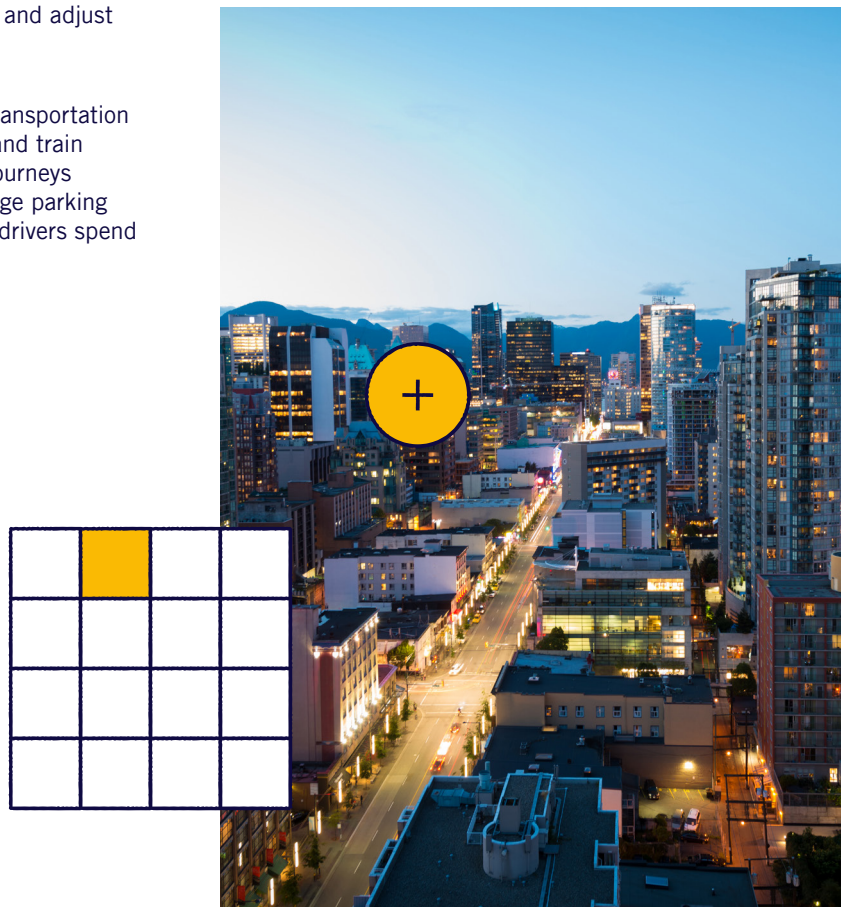
Traffic congestion is a major challenge in many cities, leading to increased travel times, fuel consumption, and pollution. Live Awareness AI addresses this issue by providing intelligent traffic management solutions. By analysing data from traffic cameras, sensors, and GPS devices, the AI can predict traffic patterns and adjust traffic signals accordingly.

This technology can also optimise public transportation by providing real-time information on bus and train schedules, helping commuters plan their journeys more effectively. Additionally, AI can manage parking spaces more efficiently, reducing the time drivers spend searching for parking.

## Promoting Sustainable Urban Practices

Sustainability is a key priority for modern cities, and Live Awareness AI plays a crucial role in promoting environmentally friendly practices. The technology can monitor air and water quality, track energy usage, and manage waste collection, helping cities reduce their environmental footprint.

For example, AI can optimise waste collection routes, reducing fuel consumption and emissions. It can also monitor pollution levels and identify sources of pollution, enabling authorities to take targeted actions to improve air and water quality.



# Conclusion

The integration of AI into smart cities holds immense potential for improving urban life. SenSen's Live Awareness AI exemplifies how AI can be harnessed within an AI for Good framework, providing real-time insights and predictive analytics to enhance public safety, optimise traffic flow, and promote sustainable urban practices. By leveraging these technologies, cities can become more efficient, resilient, and inclusive, ensuring a better quality of life for all residents.

AI for Good in smart cities is not just about technological advancement but about creating holistic improvements that benefit all citizens. By addressing urban challenges and enhancing the quality of life, AI can play a crucial role in building smarter, efficient, productive, and more sustainable cities. As we move forward, it is essential to continue exploring and implementing AI solutions that align with ethical standards and prioritise the well-being of urban communities.



# About SenSen.ai



**Around the world, cities and businesses are confronted with a seemingly insoluble paradox: they are faced with issues too complex to meet effectively without AI, yet these tools come with a stigma attached to them.**

**SenSen is the solution.**

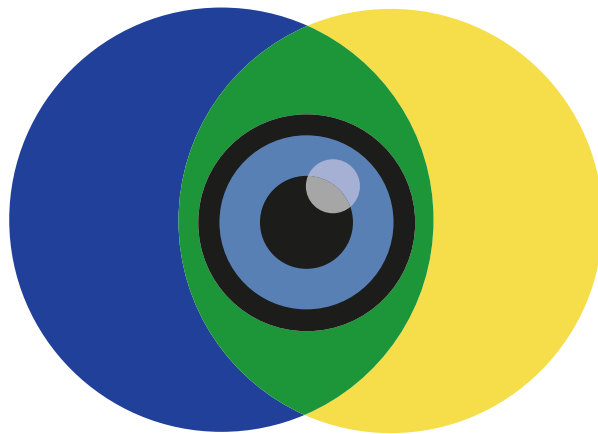
As the leader of the Live Awareness movement and ecosystem that harnesses AI and IoT to drive major social and commercial good across an ever-expanding array of human activities, SenSen is the definition of AI for Good.

Through SenSen, cities and enterprises access a constantly evolving and inspirational platform-based approach to AI and external data for a better, more human world full of curiosity, wonder, discovery and meaning.

## **Author - Prof. Subhash Challa**

Before founding SenSenAI in 2007, Subhash developed his world-leading expertise in Data Fusion as an academic, parlaying a BA in Electrical Engineering in his hometown of Hyderabad, India into a PhD on Signal Processing from the Queensland University of Technology (QUT), building up a particular conversance with Estimation Theory and Object Tracking that would lead to him publishing a foundational reference text on both subjects, *Fundamentals of Object Tracking*, in 2011.

Through his work, Subhash has sought to make a positive impact on the world through AI. In addition to possessing 30 international patents and being published in over 150 peer-reviewed journals on the subjects of AI, Security/Trust, Sensor Networks, Subhash speaks frequently on these subjects at professional and academic conferences worldwide. He is a charter member/vice president of TiE Melbourne, where he currently lives.



**Thankyou**  
for reading  
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