Artificial Intelligence in Tier-2 Smart Cities: A Critical Evaluation of Its Impact on the Public Realm

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Abstract:

Artificial Intelligence (AI) is widely considered as a driving mechanism of smart city development in India. The Smart Cities Mission has become a torch bearer for tier-2 cities with many introducing digital infrastructure initiatives such as surveillance systems, data dashboards, Integrated Command and Control Centres (ICCCs), and so on. Although many of the smart digital infrastructure solutions are often described as AI-enabled, the adoption of advanced AI systems in urban designing and public space planning remains constrained. In most cases, the adoption of AI is primarily limited to planning, pilot projects, or basic data management stages.

Through this paper we intend to examine the current and proposed role of AI in smart cities, especially tier-2 smart cities across the country. It explores if the current AI initiatives finds applications in improving public spaces or is limited to support the administrative layer aimed at improving efficiency. This paper prioritizes identifying the gaps between technology ambition and spatial transformation, arguing for a systematic human-centered approach to integrate AI in public space development and urban design.

Keywords:
Artificial Intelligence (AI), Smart Cities Mission, Tier-2 Cities, Public Realm, Urban Design, Human-Centered Design

Introduction:

The Smart Cities Mission has boasted the concept of smart city, making it a crucial part of urban development. Many cities are undertaking digital transformation initiatives and deploying smart or autonomous systems essential for delivering highly spatial experiences, improving governance, service delivery, etc. Policy discussions often discuss AI as a future tool facilitating improved public safety, waste management, environment monitoring, etc. rather than being a present reality.

In India, the current adoption of advanced AI tools/solutions/systems is limited to planning and designing, with many cities using digital monitoring systems and data management tools. On the contrary, AI-based decision making is still in the early stages of planning and early development stages despite AI being frequently described as a transformative solution to address urban challenges.

Public spaces such as streets, parks, plazas, and transit corridors are essential for public safety, social life, and urban identity. For architects and urban designers, attention to inclusivity, accessibility, comfort, and human experiences are of utmost importance than technology efficiency to improve these spaces. Therefore,

it becomes important to question whether current smart city initiatives are truly influencing the design and quality of public spaces.

In this paper, we will critically evaluate the existing and proposed role of AI in tier-2 smart cities across India, examine if AI is actually reshaping the public realm, or if it is limited to being a management and governance tool. Consequently highlighting the gap between technology planning and spatial improvements. This paper also aims to highlight and suggest a more human centered approach to AI integration in urban planning, designing, and developments.

Literature Review:

Over the past decade, AI in smart cities has gained significant attention from academia and policy makers. AI has emerged as a promising tool to enhance urban efficiency, data driven governance, and sustainability. Recent systematic reviews suggest that AI applications in smart cities mainly focus on public safety systems, environment monitoring, energy management, and transportation optimization. Machine learning and data analytics tools are used to predict traffic patterns, improve service delivery, pollution level monitoring, etc., emphasizing the technical capabilities and potential of AI to transform urban management systems through predictive decision making and automation.

In the context of AI adoption and implementation in India, current research indicates that AI is largely positioned as an enabler of the Smart Cities Mission and digital infrastructure solutions such as Integrated Command and Control Centres (ICCCs), surveillance systems, and data dashboards are often presented as AI-enabled solutions are positioned as AI-enabled solutions. Most Indian cities are in the early stage of digital transformation with implementation primarily revolving around data collection, monitoring systems, and administrative coordination rather than AI-driven planning or autonomous decision-making, highlighting the gap between policy ambitions and practical implementation.

Further, technical surveys on machine learning and deep learning models demonstrates the strong potential of AI in urban sustainability. These studies highlight how AI can be leveraged for smart mobility systems, waste management optimization, disaster prediction, and resource efficiency. Additionally, emerging research on generative AI suggests interactive urban systems, digital twins, and intelligent simulation models as potential deployment areas, influencing future city planning. Despite this, much of the existing literature focuses on technology performance and efficiency rather than spatial design outcomes.

What emerges as a critical observation across the literature is the AI discussions being centered around governance, infrastructure management, and operational efficiency. Research examining the influences of AI on physical quality of public spaces remains limited. The direct contribution of AI to enhance inclusivity, spatial comfort, or human experience in the public realm remains vaguely established, creating a very important and addressable research gap focusing on urban design implications.

While the current literature suggests that AI is a promising technology, the role and advantages of AI's integration into human-centered urban design remains unexplored. While most studies emphasize digital governance and system optimization, fewer address AI's transformative and meaningful impact on public spaces. This gap forms the foundation of the present study, critically evaluating the real and proposed impact of AI on the public realm in Tier-2 smart cities.

Research Gap

Although many studies discuss the role of Artificial Intelligence in smart cities, most of them focus on technological efficiency, data management, and governance systems. Existing research largely examines how AI can improve traffic control, surveillance, energy use, and service delivery. In the Indian context, literature often highlights policy intentions and digital infrastructure such as Integrated Command and Control Centres, but provides limited evidence of how AI is actually influencing the physical design and experience of urban spaces.

Very few studies critically explore the relationship between AI technologies and the public realm - including streets, parks, transit spaces, and social environments. The discussion is often technology-driven rather than human-centered, with minimal attention to spatial quality, inclusivity, accessibility, or user experience. This creates a clear gap between smart city technology narratives and architectural or urban design outcomes.

Therefore, there is a need for research that examines AI not only as a governance tool, but as a potential influence on public space design and urban life. This study addresses this gap by critically evaluating the current and proposed role of AI in Tier-2 smart cities in India, with a specific focus on its implications for the public realm and human experience.

Existing studies discuss the data management, governance system, and technological efficiency role in Artificial intelligence in smart cities. In the current scenario research majorly examines how AI can upgrade surveillance, traffic control, service delivery and traffic control. In the Indian scenario, literature focuses on the digital infrastructure and policy intentions such as integrated command and control centres, however provides limited data of how AI actually influences the physical design and experience of urban space.
The search results indicate that only few studies critically analyze the relationship between AI technologies and the public realm, including park, transit spaces, street and social environments. These discussions are more towards technology instead of human centered spatial experiences, accessibility, inclusivity and user experience. Which creates a significant gap between the smart city technology narratives and urban design outcomes.

Therefore this research examines AI not only as a governance tool, but its capable influence on public space design and urban life. The current study focuses on this gap by critically studying the current and proposed role of AI in TIER-2 smart cities in India, with a significant focus on its implication for the public realm and human experiences.

Methodology

This study adopts a qualitative and conceptual research approach to examine the role of Artificial Intelligence in Tier-2 smart cities in India and its potential impact on the public realm. Since large-scale AI implementation in Indian cities is still limited, the research does not rely on a physical case study, but focuses on analytical and interpretative methods to understand current practices and future possibilities.

The study first analyzes existing literature, starting with reviewing the existing academic studies on smart cities, Artificial Intelligence, and urban design to understand global perspectives and theoretical frameworks. Analyzing the existing literature helps in identifying discussions around AI in relation to governance, urban systems, and spatial development.

The study includes review and examination of policy documents, official reports, Smart Cities Mission guidelines, and government publications, allowing to understand how AI is positioned in Indian urban policy and plans to integrate digital technologies in development strategies.

Additionally, we have used a comparative review approach to compare discussions of AI in smart cities in Indian context with that of global context aimed at identifying differences between the technological potential and actual implementation, specifically in relation to public space design and urban experiences.

Finally, a conceptual framework is developed that proposes potential approaches to effectively integrate AI in planning and design of public spaces in Tier-2 cities. This framework is developed based on the gaps identified through literature and policy analysis and aims to support a more human centered and spatially responsive approach to smart city development.

Analysis and Discussion

Digital infrastructure, data platforms, and centralized monitoring systems are the most emphasised areas of India's SMart Cities Mission as revealed from literature and policy document review. Many of the tier-2 cities have taken initiatives to establish Integrated Command and Control Centers, surveillance networks, and smart services platforms, demonstrating the government's plan to move toward data-driven urban governance. However, analysis suggests that Artificial Intelligence remains limited currently and is often more aspirational rather than being fully implemented.

A clear gap persists between planning and implementation. While official reports frequently describe cities as AI-enabled, most systems currently function merely as data collection, monitoring, or automation tools rather than independent AI-based decision-making platforms. The focus remains on improving administrative efficiency, service coordination, and security monitoring in many cases, indicating that AI is still largely positioned as a governance support tool rather than a design or planning instrument.

The impact of these technologies appears indirect from the public realm perspective. Although some systems deliver real time results such as surveillance systems improving perceived safety, and traffic management systems reducing congestion, these improvements do not automatically translate into better-designed public spaces. Elements such as walkability, accessibility, social interaction, environmental comfort, and spatial identity still depend heavily on urban design decisions rather than technical systems. Consequently, the current approach to smart cities risks prioritizing digital control over human-centered spatial quality.

This discussion highlights the need to rethink how AI is integrated into urban development. Instead of viewing AI only as a monitoring or efficiency tool, cities could explore how data insights support inclusive planning, climate-responsive design, and improved public space usability. By aligning technological systems with spatial design goals, AI has the potential to move beyond governance and contribute meaningfully to the quality of urban life.

Proposed Framework for Integrating AI in the Public Realm of Tier-2 Cities in India

For Tier-2 cities in India, Artificial Intelligence needs to be treated as a practical support system for improving everyday public spaces rather than a futuristic solution. As most cities are still in the planning and early implementation stages under the Smart Cities Mission, understanding how streets, parks, and transit areas actually work for people should be prioritized. AI systems should be used for analysing pedestrian movement, identifying unsafe crossings, locating poorly used parks, and mapping accessibility gaps. These insights can guide planners to design more comfortable and inclusive public spaces that reflect real behaviour, up from mere planning assumptions.

This should be followed with modest, data supported urban management instead of technological experiments. The frame should rely on simple yet concrete tools such as GIS mapping, complaint data, and basic sensor inputs connected to existing control centres and many of the tier-2 cities have limited technical capacity. This will result in leveraging AI in monitoring maintenance needs, detect overcrowded junctions, track heat stress in open spaces, or identify areas where lighting and safety improvements are required. This way, technology will strengthen governance rather than replacing it.

Additionally, improving mobility and environmental comfort in public spaces is another layer that should be prioritized. Challenges such as mixed traffic, informal markets, unsafe pedestrian crossings, and lack of shaded areas are the reality that exists in many of the tier-2 cities. AI should be leveraged to support adaptive traffic signals near high sensitivity areas (schools, markets, etc.), smart lighting in residential streets, and environmental monitoring to guide tree planting or cooling strategies. The primary objective is to leverage AI in designing context specific solutions rather than one uniform small model as different cities and different parts within cities need different responses.

Overall, this framework considers AI as a tool that helps planners, designers, and local governments make better decisions and not as the goal. For Tier-2 Indian cities success will be measured by whether public spaces become safer, more comfortable, and more inclusive for everyday users, and not by advanced technology alone. AI can fundamentally support the improvement of the public realm instead of remaining only a planning slogan if introduced gradually and linked to real urban problems.

Conclusion:

In conclusion, utilization of Artificial Intelligence in Indian Tier-2 smart cities is still more of a future direction than a present reality. Although many cities are building digital systems and planning technological upgrades, these changes have not yet significantly improved how people actually experience public spaces in their daily lives. Streets, parks, and transit areas are still shaped more by traditional planning decisions than by intelligent systems.

This paper highlights that AI should be used as a practical tool that helps planners, architects, and city authorities understand how public spaces actually function. AI, when deployed and used carefully, can support safer streets, better mobility, improved environmental comfort, and more inclusive public environments. This will come to reality when technology is connected to real urban needs and human behaviour.

Thus, the focus for Tier-2 cities in India should be on gradual and people centric integration of AI. Smart urban development will succeed not because cities use advanced systems, but because those systems fundamentally improve everyday life. A human centred approach to AI can help Indian cities move towards smarter, more liveable, and more responsive public spaces in the future.

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