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Strategies and Implications that Can be Used to Improve Walkability through Urban Design

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Abstract: Designing spaces for walking has become popular in the belief that it contributes positively to health status, environmental conservation, economic development, and social coherence. As such there is increasing need to assess how walkable our cities are so that we can plan better for their future. "Walkability" refers to how enjoyable it is to walk around an area and it forms an integral part of urban design that helps make a city healthy, sustainable and lively.

This paper aims at exploring deeply into urban design's role in promoting walkability within different settings with researches findings as well as real life examples being highlighted on various ways on how best pedestrian friendly environments can be developed. In addition to this it also examines the benefits realized by having more walk able towns in terms of environment efficiency and economy opportunities as well as drawbacks faced when bringing about this aspect.

Besides linking past studies together through this paper provides insights on relevance of the above-mentioned concept on policy makers, planners in town planning fields and designers. It gives a detailed account behind telling us that we need "walkable cities" and goes further ahead explaining what makes our cities as they are given their architecture design implications for daily footsteps in each quadrant.

Keywords: Walkability, Built Environment, Pedestrian Safety, Urban Design, Neighbourhood Design.

1. Introduction

"Walkability is the quality of walking conditions and the degree to which the built environment encourages walking by providing pedestrians a safe, comfortable, convenient and appealing travel corridor" (MARC,1998).

The 21st century has witnessed unprecedented urbanization, leading to significant shifts in the dynamics of city living. With an increasing global population gravitating towards urban centers, the need for sustainable urban development has never been more pressing. One key aspect of this sustainable urban development is the promotion of walkability – the extent to which an environment is conducive to pedestrian movement. Urban design plays a pivotal role in shaping the physical and social characteristics of cities, making it a powerful tool in fostering walkable communities.

Cities are the engines of our economy and hubs of innovation, but car-centric design often prioritizes vehicle traffic over pedestrians. This prioritization has led to a decline in walkability, with negative consequences for public health, the environment, and social interaction. In contrast, walkable cities offer a multitude of benefits. Residents enjoy improved physical and mental well-being, reduced reliance on

cars lowers pollution levels, and vibrant pedestrian areas attract businesses and foster a sense of community.

This research paper explores the strategies that urban design can utilize to improve walkability. We will examine how prioritizing pedestrians, and creating a well-connected and safe network of walkways can encourage walking as a preferred mode of transportation. Additionally, we will investigate the urban design elements that enhance the pedestrian experience, such as incorporating greenery, public spaces, and street furniture.

By analyzing these strategies and their potential implications, this paper aims to contribute to the development of more walkable and sustainable urban environments.

1.1 Key urban design strategies for enhancing walkability in a city.

Walkability is a key indicator of urban design quality. There are various examples of urban design interventions that can improve walkability in different contexts and scales. Key urban design strategies that can enhance walkability in a city include deliberate changes or additions to the physical environment such as improving accessibility to resources and destinations within and around the city, ensuring safe and continuous sidewalks, implementing traffic calming measures, creating pedestrian-only streets and plazas, and designing mixed-use developments that encourage walking. These strategies aim to enhance walkability and accessibility, which can positively affect the health, safety, and mobility of residents and visitors. Widening sidewalks and creating pedestrian-only zones are essential in making a city more pedestrian-friendly. Enhancing crosswalks and traffic signals with countdown timers and audible alerts can also improve pedestrian safety. Prioritizing pedestrians in urban planning processes is crucial in building sustainable, livable, and vibrant cities. Pedestrian-friendly design strives to provide safe and convenient walking environments, encouraging more people to choose walking as a mode of transportation. Collaboration, data-driven decision-making, and constant evaluation are necessary for embracing this paradigm shift towards more pedestrian-centric urban planning to optimize accessibility and efficiency in urban mobility.

1.2 The layout and connectivity of streets and sidewalks encourage walking.

One way to promote walking as a primary mode of transportation is to improve the layout and connectivity of streets and sidewalks. Pedestrian-friendly design can create vibrant and accessible public spaces that encourage walking. Prioritizing pedestrian safety by implementing traffic calming measures and improving crosswalks and signage can create an environment where pedestrians feel safe and empowered to choose walking as a mode of transportation. Improving the first mile/last mile connection, such as providing safe and accessible pedestrian routes to and from public transportation, can make communities more walkable and increase the likelihood of people choosing to walk. Pedestrian-friendly design can also improve the layout and connectivity of streets and sidewalks, creating a more pleasant walking experience that encourages physical activity and reduces sedentary lifestyles. Encouraging walking as a means of transportation can lead to better public health outcomes and reduced rates of chronic diseases, making it an important goal for city planners and policymakers.

1.3 The integration of green spaces and public amenities plays an important role in promoting walkability.

Incorporating green spaces and public amenities into the design of walking routes can promote walkability by encouraging community engagement and social interaction. When people have places to stop and rest along their walking route, they are more likely to take longer walks and enjoy their surroundings. Green spaces such as parks, community gardens and urban forests can provide a natural setting for people to

connect with nature and enjoy the outdoors. Furthermore, public amenities such as benches, water fountains, public restrooms and public art installations can make walking more comfortable and enjoyable for pedestrians. The inclusion of these amenities can encourage people to walk instead of driving, especially for short distances. By promoting walkability through the integration of green spaces and public amenities, individuals can experience improved physical health outcomes by increasing their level of physical activity, while also creating a more vibrant and lively community.

2. Methodology

This research investigates strategies for enhancing walkability through urban design, focusing on the Indian context, taking the case studies of two proposed sites in Delhi: Connaught Place and Khan Market.

1. **Case Studys:**
Case studies of Connaught Place and Khan Market, both of which have undergone transformations to prioritize pedestrians.
This will involve analyzing pre- and post-pedestrianization design plans, implementation documents, and any available data on pedestrian activity and user experience.
By focusing on these specific Indian examples, we aim to identify successful strategies employed in the local context and any challenges encountered.

2. **Literature Review:**
Alongside the case studies, a comprehensive review of existing literature on urban design and walkability, with a specific focus on Indian cities, will be conducted.
Scholarly journals, books, government reports, and online resources from reputable organizations will be examined.
This review will aim to identify generalizable strategies for improving walkability that can be applied within the Indian context.

By combining these two methods, our research aims to provide a thorough understanding of strategies for enhancing walkability through urban design and how they can contribute to creating healthier, more sustainable, and vibrant urban environments.

3. Evaluation of Case Studies

In order to provide strategies and implications that can be used to improve walkability through urban design, two representative instances of urban environments from various locations were chosen for analysis. The case studies of Connaught Place, Delhi and Khan Market, Delhi, these two case studies are chosen for research.

3.1 Pedestrianisation of Connaught Place

In today's context, Connaught Place not only serves as the physical heart of Delhi but also stands as a vital center for culture and commerce. It holds a significant status as one of Delhi's most iconic public spaces, catering to trade, business, relaxation, and daily activities, fostering a harmonious blend of comfort and liveliness. Initially conceived as a marketplace catering to the elite British community, it exudes elegance and grandeur, drawing inspiration from architectural marvels like Nash's Regent Crescent in London and

Royal Crescent in Bath. Characterized by spacious colonnades and Palladian archways enclosing a central circus, Connaught Place aimed to establish a sense of architectural cohesion.

However, since the 1990s, the focus of development in Connaught Place has shifted towards managing and organizing its spaces to tackle congestion issues. The sheer scale of the area presents challenges regarding cleanliness and maintenance, hindering potential public interactions or utility enhancements. Concerns have emerged regarding excessive congestion caused by surface parking, both on and off the streets.

Addressing these issues necessitates strategic planning to ensure a vibrant yet safe nightlife, efficient and well-regulated parking facilities, seamless last-mile connectivity, and the smooth operation of service vehicles for goods transportation. Furthermore, there's a need to tackle the rehabilitation of premises such as petrol pump stations and motor service centers. Policy-level interventions are crucial to incentivize the reuse of courtyards, regulate vendor activities, and limit private vehicle usage of road space.

In response to these challenges, measures have been proposed, including premium parking provisions, shuttle services connecting the circus to multi-level parking facilities, and promoting sustainable mobility within the area.

3.1.1 About the Site

Map Showing Connectivity of Connaught Place to Surroundin
Base Map Source: Google Earth

Figure 1

All roads leading up to Connaught Place are significant in terms of linkage as well as location of buildings of natural and state level importance. This can be best observed by looking at each road individually as the radical geometry provides multiple connectivity alternatives for the incoming and outgoing traffic.

- Barakhamba Road serves as the link between Connaught Place and the Mandi House roundabout, a focal point for Delhi's cultural scene, housing various auditoriums, art schools, and cultural institutions. Along Barakhamba Road, one can find the iconic Statesman House alongside several upscale office buildings and the renowned Modern School.

- Continuing along the outer circle, Janpath emerges, leading towards Aurobindo Marg, traversing South Delhi. Once a hub of educational and cultural significance in Delhi, Janpath is now home to institutions like the Eastern and Western courts, the National Archives, IGNCA, and the National Museum, while also being known for its popular street shopping on Janpath lane.

- Sansad Marg, or Parliament Street, connects Connaught Place and the Indian Parliament, flanked by notable landmarks such as the Reserve Bank of India and the ancient astronomical observatory, Jantar Mantar.

- Moving beyond Sansad Marg lies Baba Kharak Singh Marg, housing various state emporiums. Hanuman Mandir on BKS Marg attracts visitors from NCT Delhi and its surrounding towns on

Tuesdays and weekends, while Bangla Sahib Gurudwara serves as another revered worship center, drawing large crowds.

- Panchkuian Road facilitates traffic flow from the old market of Paharganj to Connaught Place, serving as a route for commuters from the northern and northwestern parts of NCT Delhi.

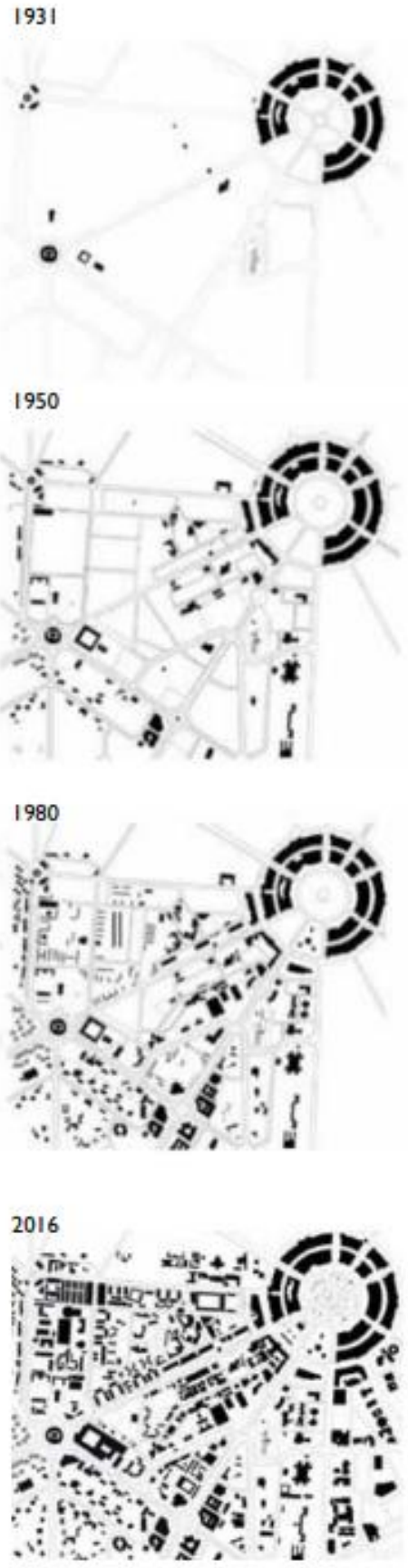
- Lastly, Chelmsford Road and Vivekananda Marg (commonly known as Minto Road) are the final major arteries leading out of Connaught Place, providing access to New Delhi Railway Station and railway lands. Minto Road also serves as the primary entry point for traffic from East Delhi via Vikas Marg.

3.1.2 Administrative Framework

The development and maintenance of Connaught Place occur within various frameworks, as it falls under the jurisdiction of the NDMC area, recognized as a seat of the Union Government.
As outlined in the Master Plan of Delhi, Connaught Place and its Extension (including Janpath, Sansad Marg, Baba Kharag Singh Marg, Panchkuian Road, Barakhamba Road, Kasturba Gandhi Marg), Gole Market, Mandi House, Pragati Maidan, and Indraprastha Estate are identified as one of the three Metropolitan City Centers in NCT Delhi. The vision for these city centers, according to MPD 2021, is to be viewed in light of the historical significance of precolonial and post-colonial capital cities of old and new Delhi. They are envisioned as city-level centers for shopping, entertainment, socio-cultural activities, and other functions similar to those indicated for District Centers.

3.1.3 Evolution of Connaught Place (CP)

- The development aimed to create a mixed residential and commercial center.



- A commercial hub tailored for upscale shopping, targeting the affluent residents of the nearby Lutyen's Bungalow Zone.
- Incorporating residences on upper floors to facilitate shopkeepers' living arrangements at their workplace.
- Following independence, Connaught Circus began undergoing changes with the emergence of informal vending within the inner circle, catering to the relatively less affluent populace gaining access to CP.
- Informal markets sprang up in the vicinity of CP at Janpath, Shankar, and Yusufsarai Markets.
- Verandas were designated as public spaces, formalizing the temporary markets.
- The introduction of high-rise structures around CP altered the skyline.
- Most of the high-rise buildings surrounding CP were primarily commercial in nature.
- The introduction of the metro system granted previously inaccessible segments of the population access to CP, including school and college students, women, and the elderly from middle-class backgrounds.
- Renovation efforts were undertaken for the Commonwealth Games, enhancing the area's aesthetic appeal.

3.1.4 Issues

Issues pertaining to the area:

3.1.5 Design Stratigies

3.2 Pedestrianisation of Khan Market

Khan Market, located in Central Delhi, initially served as a residential colony for immigrants from the North-West Frontier Province following the Partition of India. However, by the 1980s, it underwent a transformation into a bustling commercial hub to cater to the needs of its growing population. Today, it ranks as the 28th most expensive retail location globally, boasting a plethora of eateries and high-end retail showrooms (as per a study by Cushman & Wakefield, sourced from http://www.livemint.com/Industry/uxT0YipQGukZIYZPeXSnKI/Delhis-Khan-Market-is-the-28-mostcostliest-retail-location.html).

The customer base in Khan Market primarily comprises elite shoppers drawn to luxury brands, leading to a significant reliance on private vehicles for accessing the market. Moreover, the provision of "Free Parking" by the Shopkeepers Association incentivizes customers to bring their vehicles rather than opting for public transport or other sustainable modes of transportation. Consequently, this situation compromises the urban quality of the neighborhood, resulting in:

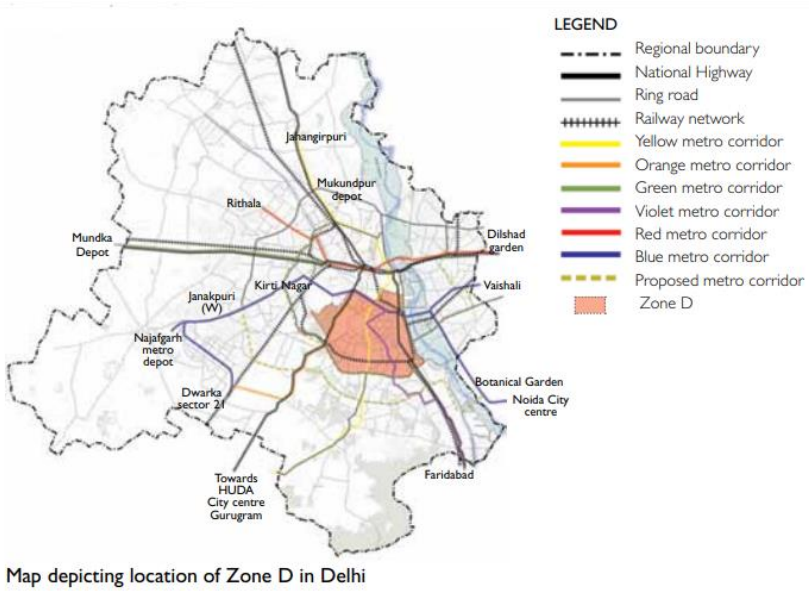
Reduction of urban living space: Infrastructure for motorized transport, such as roads and parking facilities, occupies valuable city center land, encroaching upon and threatening existing open spaces.

Air and noise pollution: The increasing influx of vehicles into the market precincts contributes significantly to urban noise and air pollution.

Visual intrusion: The presence of parked cars and associated infrastructure detracts from the quality of the urban and visual environment.

In response to these challenges, the DUAC was approached by the NDMC to devise a comprehensive scheme integrating design with policy interventions aimed at facilitating the pedestrianization of Khan Market.

3.2.1 Site location and Context



Map depicting location of Zone D in Delhi

- Khan Market is situated within Zone 'D', primarily encompassing the Lutyens Bungalow Zone (LBZ).
- Zone 'D' is positioned in the southern region and adjoins the historic city of Shahjahanabad, extending towards the Ring Road. To its east lies the River Yamuna, while its western border is marked by Paharganj, Karol Bagh, rehabilitation colonies such as Rajinder Nagar, and the Pusa Institute.
- Access to these areas is facilitated by Panchkuian and Minto Road to the north, Mathura Road to the east, Sir Ganga Ram Marg to the west, and the Ring Road to the south.
- This zone is nestled between the River Yamuna on one side and the ridge on the other, encompassing significant central areas of Delhi.
- It boasts excellent connectivity via road transport and the Metro Rail Transit System (MRTS), complemented by dedicated cycle lanes and pedestrian pathways.

3.2.2 Summary of Issues

Components	Issues	Description	Photographic evidences
Pedestrian	(a)Insufficient footpath width	The footpaths along the side lanes are only 1.0m wide which do not enable two pedestrians to cross over.	
	(b) Encroached footpath breaking the pedestrian continuity	Since Khan Market has a lot of grocery stores, they display their items on the footpath, thus encroaching half the available widths.	
	(c) Middle lane footpath not shaded and maintained	• The Middle lane is not shaded . • Pavers broken at various points making the walking experience cumbersome.	
Vehicular	(d) Auto idling at the entrance of Khan Market	• Autos queue up at the entry of market disrupting traffic movement No provision for cabs/autos (IPT) leads to idling on surrounding roads.	
Parking	(e) Along the roads	Parking spillover on roads causes congestion in peak hours due to in and out movement of vehicles	
	(f) Along the shopfronts	Disconnects the shop front visually and also congests the vehicular circulation.	
	(g) Free parking made convenient for the shoppers by the traders association	It is made easy and accessible by parking attendants and designated on street parking which fulfils the parking demand.	
Utilities	(h) Utilities like solid waste management and waste water management not planned for	The utilities are not formalised in the market as the buildings are old and, retrofitted. They do not have defined mechanisms for maintaining the utilities like solid waste.	

3.2.3 Proposed elements in Pedestrian plaza

Pedestrian corridor in shopping paza

- A widened pedestrian corridor helps to handle pedestiran volumes and provide adequate landscaping / amenities.
- It is also improve safety, calm traffic, and have the potential to revitalize the economy of the street as window shoppers take up about 1.5 to 2 feet of space.

Seating around the road edge

- Bench seating with pergola for shading become pause points for people to sit, relax and become 'Eyes on the street'.

Shading devices in pedestrian streets

Due to the extreme weather conditions of the city, it is suggested to provide shading mechanisms to provide comfort and protection from the harsh weather.


Directional and wayfinding signages

- Signages help locating various public facilities like Public Toilet, drinking water, parking etc.
- Maps help in wayfinding logical places like halting zones, taxi/auto stands, bus stop/metro stations etc.


Drinking water facility

Drinking water fountains/taps should be placed conveniently and at accessible points where the users can locate them easily.


Dustbins

- Dustbins to be placed in the pedestrian plazas and pathways to discourage littering.
- Colour coded dustbins enable segregation of wet and dry waste.

Proposal along Rajesh Pilot Marg edge

View showing the widened Pedestrian Plaza along Rajesh Pilot Marg edge

Widened Pedestrian plaza for shoppers and visitors

Pergola shaded seating provided at intervals acting as 'Pause Points'

Continuous hedges along Rajesh Pilot Marg which act as a buffer for Pedestrian plaza from traffic and also break the entry for vehicular movement

4. Developing Strategies for enhancing walkability

Enhancing walkability in a community involves various strategies aimed at making walking a more convenient, enjoyable, and safe mode of transportation. Here are several strategies to consider:

4.1 Pedestrian Infrastructure Improvement:

- Build sidewalks and widen existing ones.
- Ensure pedestrian-friendly crossings, such as crosswalks with signals and refuge islands.
- Install curb ramps for accessibility.
- Implement traffic calming measures to reduce vehicle speeds in pedestrian zones.
- Create pedestrian-only streets or zones in appropriate areas.

4.2 Mixed-Use Development:

- Encourage mixed-use zoning that integrates residential, commercial, and recreational areas to reduce the need for long trips.
- Promote the development of neighborhoods where essential amenities are within walking distance, such as grocery stores, schools, parks, and healthcare facilities.

4.3 Public Transport Integration:

- Integrate public transportation with pedestrian infrastructure, making it easier for people to access transit stops on foot.
- Implement transit-oriented development around transit hubs to encourage walking as part of a multimodal commute.

4.4 Bicycle Infrastructure:

- Develop bike lanes and paths that complement pedestrian walkways.
- Provide secure bike parking facilities at key destinations to encourage cycling as a mode of transportation, which often complements walking.

4.5 Street Design and Landscaping:

- Implement streetscape enhancements such as street trees, benches, lighting, and public art to create an attractive walking environment.
- Design streets with narrower lanes and shorter crossing distances to prioritize pedestrian safety.
- Prioritize landscaping that provides shade and shelter from the elements.

4.6 Community Engagement and Education:

- Educate the community about the benefits of walking and promote walking as a healthy and sustainable mode of transportation.
- Involve residents in the planning and design process to ensure that pedestrian infrastructure meets their needs and preferences.
- Organize walking events, such as neighborhood walks or walking school buses, to build a sense of community and encourage walking.

4.7 Policy and Regulation:

- Implement policies that prioritize pedestrian safety and accessibility in transportation planning and development decisions.
- Enforce traffic laws to protect pedestrians and hold drivers accountable for pedestrian safety.
- Consider implementing policies such as pedestrian-first streets, where pedestrians have priority over vehicles.

4.8 Data Collection and Monitoring:

- Collect data on pedestrian activity, including pedestrian counts, travel patterns, and safety incidents, to inform planning and decision-making.
- Use feedback from pedestrians to identify areas for improvement and measure the effectiveness of interventions.

By implementing these strategies in a comprehensive and integrated manner, communities can create environments that support and encourage walking as a viable transportation option, leading to numerous benefits including improved public health, reduced traffic congestion, and enhanced quality of life.

5. Conclusion

Enhancing walkability through urban design is crucial for creating healthier, more sustainable, and vibrant communities. This research paper has explored various strategies and implications for improving walkability, encompassing a range of interventions from pedestrian infrastructure improvements to community engagement and policy implementation.

By implementing these strategies, urban designers and planners can create environments that prioritize pedestrian safety, accessibility, and comfort. Mixed-use development, public transport integration, bicycle infrastructure, and street design enhancements all contribute to fostering a pedestrian-friendly urban landscape where walking becomes a preferred mode of transportation.

Furthermore, the implications of enhancing walkability extend beyond mere transportation. Walkable communities promote social interaction, economic vitality, and environmental sustainability. They encourage physical activity, reduce reliance on cars, and mitigate the negative impacts of urban sprawl.

However, it is essential to recognize that improving walkability requires a multi-faceted approach involving collaboration among various stakeholders, including government agencies, community organizations, developers, and residents. Additionally, ongoing evaluation and monitoring are necessary to assess the effectiveness of interventions and ensure that they meet the evolving needs of the community.

In conclusion, prioritizing walkability through urban design not only improves the quality of life for residents but also contributes to building more resilient, inclusive, and livable cities for generations to come. As cities continue to grow and evolve, integrating walkability into urban design practices will be essential for creating healthier and more sustainable urban environments.

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