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Editorial

The Implications of Human Mobility and Accessibility for Transportation and Livable Cities

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Understanding human movement and transportation accessibility has become paramount in shaping the very fabric of our communities. This exploration has profound implications, not just for the physical layout of cities and towns, but for the well-being of their residents, spanning from localities to the global level. Human mobility and transportation are not just about bridging two points on a map. They represent a multifaceted endeavor that is intertwined with the socio-economic and cultural aspects of communities. At its core, this endeavor about crafting cities and towns that are not only connected but are also inclusive, sustainable, and economically vibrant. When transportation needs are met with precision and foresight, this paves the way for residents to access a plethora of opportunities, from employment to education, and from healthcare to recreation. This not only boosts the economic vitality of the region but also elevates the standard of living of its inhabitants. The digital age, marked by the rise and widespread use of mobile phones, has added a new dimension to this study. The ubiquitous presence of GPS technology in these devices has revolutionized our capacity to delve deep into individual and collective movement patterns. Such technological advancement has led to a massive surge in the amount of available data on human interaction and travel patterns.

With mobile phones now being an extension of our personas, they serve as a lens, offering insights into movement patterns with a granularity and scale that were once beyond our imagination. Yet, with this deluge of data comes responsibility. Advanced algorithms and burgeoning computational power have equipped us with tools to sift through these data, extracting meaningful patterns and insights. But the real challenge lies in translating these insights into actionable strategies that enhance urban livability and elevate the quality of life of city dwellers. As we harness this data-driven power, we must continually ask: are our analytical tools and methodologies truly augmenting our understanding of what makes a city 'livable'? Furthermore, as we navigate this data-rich landscape, it is imperative to tread with caution. Ethical considerations and user privacy should be at the forefront of our endeavors. In our quest for knowledge and improvement, we must ensure that individual rights and privacy are not compromised. As AI and big data analytics continue to evolve, their integration in urban planning and operation will potentially lead to more efficient, sustainable, and livable cities (Sanchez et al., 2023) [1]. However, ethical considerations, data privacy, and community engagement should always be at the forefront of any human mobility study.

This Special Issue explores the intricate relationship between human mobility and accessibility within the broader contexts of transportation and urban living. Spanning diverse geographies, methodologies, and perspectives, ranging from international road networks to localized public transport in small urban settings, the collection of articles presented here dig deep into what constitutes efficient, equitable, and sustainable transportation and how these elements contribute to more livable cities. As cities continue to evolve, we hope that the insights presented here will guide policymakers, urban planners, and researchers in their quest to create more accessible, efficient, and livable urban spaces.

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The first article, "A Geometric Classification of World Urban Road Networks" by Badhrudeen, Derrible, Verma, Kermanshah, and Furno (2022), focuses on the task of categorizing road networks in 80 of the world's most populated cities. Leveraging complex mathematical techniques and topological properties, the authors identify five unique classes of cities—Gridiron, Long Link, Organic, Hybrid, and Mixed [2]. The significance here is twofold: not only do these classifications reveal innate geometrical patterns across global cities, but they also offer a valuable framework enabling transport planners to customize their policies according to city-specific characteristics.

Shifting the lens to Kerman, Iran, the second paper by Masoumi, Chakamera, Mapamba, Pisa, and Soltanzadeh (2022) examines how various factors, such as age, gender, and household size, influence choice of transportation [3]. Interestingly, this study examines the contrasts between developed and developing nations in regard to the drivers of travel mode choice, challenging traditional transport planning models. For instance, contrary to popular belief, larger household size in Kerman is correlated with lower car ownership. These context-specific insights imply the need for more nuanced transport policies that accommodate cultural and socio-economic variables.

Focusing on Michigan, the third article by Kotval-K, Wilkinson, Brush, and Kassens-Noor (2023) highlights the challenges faced by vulnerable populations—like seniors and low-income residents—in small urban and rural settings [4]. A lack of reliable transportation not only exacerbates social inequities but also has tangible repercussions for public health. Isolation, both physical and psychological, is shown to be a direct outcome of inefficient transit systems, making this paper an urgent call to integrate public health perspectives into transportation planning.

The fourth paper contributes a novel angle by applying the Node–Place model to explore land use and transportation dynamics along the I-287 Corridor in New York. Baghestani, Najafabadi, Salem, Jiang, Tayarani, and Gao (2023) go beyond the model's traditional application to rail systems, extending its relevance to highways [5]. This article finds that balanced areas, in terms of traffic and customer flow, often receive robust support from local governments, underlining the interdependence of administrative backing and sustainable development.

Lastly, Bhatnagar and Ram (2023) present a Railway Station Accessibility Index (RsAI) incorporating various metrics like network performance into a weighted accessibility measure [6]. As urban congestion intensifies, this paper highlights the increasing difficulty in accessing railway stations, consequently affecting overall railway efficiency. It not only classifies railway stations based on their accessibility but also underlines the need to focus on last-mile connectivity to improve overall transportation systems.

Common among these papers are the themes of sustainability, equitable access, and the need for adaptability in planning and policy. The diverse range of articles offer both macro and micro perspectives, highlighting the need for holistic, context-sensitive, and forward-thinking transportation policies. While each paper approaches the subject from a distinct angle, be it through global comparative analytics or community-based surveys, they collectively underscore the complex and interconnected nature of transportation systems and human behavior. Moreover, they confirm the need for multi-disciplinary approaches that respect both universal principles and local peculiarities in striving towards more accessible and livable urban environments. This Special Issue provides important perspectives on human mobility and urban accessibility but recognizes areas for enhancement. There is a need to broaden the geographical focus, address potential data gaps, and explore deeper socio-cultural influences. Additionally, incorporating environmental factors, adapting to swift technological changes in transportation, and formulating practical policy suggestions will be crucial for future studies. There are also broader horizons to explore. The convergence of the physical and virtual worlds, accelerated by technological advancements, has begun to redefine traditional notions of mobility (Shaw et al., 2016) [7]. The pandemic and potential for future public health crises further underscore the need to re-evaluate our understanding of movement and accessibility, as they have profound implications on

how we navigate our cities. Moreover, the emergence of ethical urban digital twins—as virtual representations of our urban environments—offers a promising avenue for mobility research, ensuring that as we harness digital tools to understand and enhance mobility, we do so responsibly and ethically (Ye et al., 2023) [8]. In summary, as we chart the future of urban mobility research, these multifaceted influences demand our attention with a balanced perspective. These identified gaps not only highlight the limitations but also pave the way for comprehensive, interdisciplinary research in the ever-evolving urban landscape.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Sanchez, T.W.; Shumway, H.; Gordner, T.; Lim, T. The prospects of artificial intelligence in urban planning. *Int. J. Urban Sci.* **2023**, *27*, 179–194. [CrossRef]
2. Badhrudeen, M.; Derrible, S.; Verma, T.; Kermanshah, A.; Furno, A. A geometric classification of world urban road net-works. *Urban Sci.* **2022**, *6*, 11. [CrossRef]
3. Masoumi, H.; Chakamera, C.; Mapamba, L.; Pisa, N.; Soltanzadeh, H. Relations of public transport use and car owner-ship with neighbourhood and city-level travel purposes in Kerman, Iran. *Urban Sci.* **2022**, *6*, 48. [CrossRef]
4. Kotval-K, Z.; Wilkinson, A.; Brush, A.; Kassens-Noor, E. Impacts of Local Transit Systems on Vulnerable Populations in Michigan. *Urban Sci.* **2023**, *7*, 16. [CrossRef]
5. Baghestani, A.; Najafabadi, S.; Salem, A.; Jiang, Z.; Tayarani, M.; Gao, O. An Application of the Node–Place Model to Explore the Land Use–Transport Development Dynamics of the I-287 Corridor. *Urban Sci.* **2023**, *7*, 21. [CrossRef]
6. Bhatnagar, R.V.; Ram, S. Formulating a Railway Station Accessibility (RsAI) Model for Station Hierarchy Classification. *Urban Sci.* **2023**, *7*, 48. [CrossRef]
7. Shaw, S.L.; Tsou, M.H.; Ye, X. Human dynamics in the mobile and big data era. *Int. J. Geogr. Inf. Sci.* **2016**, *30*, 1687–1693. [CrossRef]
8. Ye, X.; Du, J.; Han, Y.; Newman, G.; Retchless, D.; Zou, L.; Ham, Y.; Cai, Z. Developing human-centered urban digital twins for community infrastructure resilience: A research agenda. *J. Plan. Lit.* **2023**, *38*, 187–199. [CrossRef] [PubMed]