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AI-Driven Traffic Rerouting and Driver Monitoring in Intelligent Transportation Systems: An Integrated Socio-Technical and Computational Perspective

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Abstract: The rapid urbanization of global populations and the corresponding escalation of vehicular density have intensified long-standing challenges related to traffic congestion, road safety, environmental sustainability, and infrastructural efficiency. In response to these pressures, artificial intelligence has emerged as a transformative force within intelligent transportation systems, offering adaptive, data-driven mechanisms for traffic rerouting and driver monitoring. This research article develops a comprehensive, theoretically grounded, and critically reflective examination of AI-driven traffic-based vehicle rerouting and driver monitoring frameworks, situating them within broader historical, technological, legal, and socio-ethical contexts. Drawing extensively on interdisciplinary scholarship, the article synthesizes advances in reinforcement learning, predictive analytics, distributed control, contraflow systems, and AI-enabled sensing infrastructures to articulate an integrated conceptual architecture for modern traffic management. Central to this analysis is the incorporation of a comprehensive framework for traffic-based vehicle rerouting and driver monitoring, which serves as a unifying reference point for understanding how real-time traffic data, driver behavior analytics, and adaptive control strategies converge in practice (Deshpande, 2025). Rather than treating rerouting and monitoring as isolated technical functions, this study conceptualizes them as mutually reinforcing components of a socio-technical ecosystem shaped by governance structures, urban morphology, legal regimes, and public trust. The methodology adopts

a qualitative, interpretive research design grounded in systematic literature synthesis and theoretical triangulation, enabling a nuanced exploration of both enabling mechanisms and structural constraints. The results section presents an integrative interpretation of how AI-driven approaches reshape traffic dynamics, decision-making processes, and sustainability outcomes, while the discussion critically interrogates competing scholarly perspectives, unresolved tensions, and future research trajectories. By foregrounding theoretical depth over instrumental efficiency, the article contributes a holistic academic perspective that advances the conceptual maturity of AI-driven traffic rerouting and driver monitoring research, offering implications for scholars, policymakers, and system designers alike (Zheng et al., 2021; Lukic Vujadinovic et al., 2024).

Keywords: Artificial intelligence, intelligent transportation systems, traffic rerouting, driver monitoring, reinforcement learning, urban mobility, smart cities

Introduction

Urban traffic congestion has long been recognized as both a technical and societal problem, reflecting the complex interaction between infrastructure capacity, human behavior, economic activity, and spatial planning. Historically, traffic management strategies were grounded in static rule-based systems, manual control, and infrastructural expansion, approaches that often proved inadequate in the face of rapid motorization and unpredictable demand patterns (Richards, 1956). As cities expanded and mobility needs diversified, the limitations of conventional traffic engineering became increasingly apparent, prompting a gradual shift toward data-informed and computationally enhanced solutions (Work et al., 2010). Within this historical evolution, artificial intelligence has emerged not merely as a tool for optimization but as a paradigmatic shift in how traffic systems are conceptualized, governed, and experienced.

The integration of AI into traffic rerouting represents a departure from deterministic routing logic toward adaptive, learning-based decision-making frameworks capable of responding to real-time conditions and long-term patterns. Predictive analytics, reinforcement learning, and multi-agent coordination have enabled systems to anticipate congestion, redistribute traffic flows, and dynamically adjust routing recommendations in ways that were previously unattainable (Zheng et al., 2021). At the same time, driver monitoring technologies, encompassing behavioral analytics, fatigue detection, and compliance assessment, have expanded the scope of intelligent transportation systems beyond infrastructural control to include the human operator as an active, data-generating component of the mobility ecosystem (Deshpande, 2025). This dual focus on vehicles and drivers underscores a broader transformation toward socio-technical integration, wherein technological intelligence and human behavior are co-constitutive elements of system performance.

Despite the proliferation of AI-driven traffic solutions, the academic literature remains fragmented along disciplinary and functional lines. Studies on adaptive signal control often operate independently from research on vehicle rerouting, while driver monitoring is frequently examined through the lens of safety engineering or human–computer interaction rather than as an integral component of traffic flow optimization (Wei et al., 2018; Cao et al., 2024). This fragmentation obscures the interdependencies between rerouting decisions and driver behavior, limiting the explanatory power and practical applicability of existing models. Moreover, the ethical, legal, and governance implications of pervasive driver monitoring and algorithmic decision-making remain underexplored, particularly in comparative and international contexts (Vasić et al., 2023).

Theoretical debates within the field further complicate the landscape. Proponents of AI-driven traffic management emphasize efficiency gains, emission reductions, and enhanced safety outcomes, often framing AI as a neutral optimization mechanism (Moraga et al., 2025). Critics, by contrast, caution against techno-solutionism, highlighting risks related to surveillance, algorithmic bias, and the marginalization of vulnerable road users (Buha et al., 2024). These competing perspectives reflect deeper epistemological divides regarding the role of technology in shaping urban life, as well as normative disagreements about acceptable trade-offs between efficiency and equity.

Within this contested terrain, comprehensive frameworks that explicitly integrate traffic-based vehicle rerouting with driver monitoring offer a promising avenue for theoretical consolidation. By conceptualizing rerouting and monitoring as interconnected processes mediated by shared data infrastructures and decision logic, such frameworks provide a holistic lens through which to analyze system behavior and societal impact (Deshpande, 2025). Importantly, this integrative approach aligns with emerging trends in smart city development, where mobility systems are increasingly embedded within broader digital ecosystems encompassing IoT devices, UAVs, and AIoT architectures (Milovanovic & Pantovic, 2023; Moraga et al., 2025).

The present study addresses a critical literature gap by developing an extensive, theory-driven analysis of AI-enabled traffic rerouting and driver monitoring as a unified research domain. Rather than offering incremental technical improvements, the article seeks to deepen conceptual understanding by tracing the historical roots, theoretical foundations, and interdisciplinary implications of these technologies. In doing so, it responds to calls for more reflective and integrative scholarship that situates AI-driven mobility systems within their broader social, legal, and environmental contexts (Pantović et al., 2024).

The introduction proceeds by articulating the central research problem: how can AI-driven traffic rerouting and driver monitoring be theoretically and methodologically integrated in a manner that accounts for technical performance, human behavior, and societal values? This problem is explored through a critical synthesis of existing literature, highlighting both convergences and divergences in scholarly approaches. By foregrounding the complexity of the problem space, the study establishes a foundation for the subsequent methodological and analytical sections, which elaborate on the interpretive framework and analytical strategy employed.

From a theoretical standpoint, the article draws on systems theory, distributed control, and socio-technical perspectives to conceptualize traffic systems as dynamic, adaptive networks characterized by feedback loops and emergent behavior (Wen & Arcak, 2004; Tallapragada & Cortés, 2015). These perspectives challenge reductionist views of traffic management and underscore the importance of considering interactions across multiple scales, from individual driver cognition to network-wide flow dynamics. AI, within this framework, is understood not as an external controller but as an embedded intelligence that co-evolves with the system it governs.

The relevance of this inquiry extends beyond academic discourse, bearing implications for urban policy, infrastructure investment, and public trust in automated systems. As governments and municipalities increasingly deploy AI-driven traffic solutions, questions of accountability, transparency, and inclusivity become paramount (Vasić et al., 2023). A theoretically informed understanding of integrated rerouting and monitoring frameworks can inform more responsible design and governance practices, mitigating risks while maximizing societal benefits.

In summary, this introduction establishes the necessity of a comprehensive, interdisciplinary examination of AI-driven traffic-based vehicle rerouting and driver monitoring. By situating the study within historical developments, theoretical debates, and contemporary challenges, it sets the stage for a detailed methodological exposition and an extensive analytical discussion that follows (Deshpande, 2025; Zheng et al., 2021).

Methodology

The methodological orientation of this research is grounded in qualitative, interpretive inquiry, reflecting the study's objective to develop a theoretically rich and conceptually integrative understanding of AI-driven traffic rerouting and driver monitoring systems. Rather than pursuing empirical measurement or experimental validation, the methodology emphasizes analytical depth, critical synthesis, and theoretical triangulation, approaches that are particularly well suited to examining complex socio-technical phenomena (Pantović et al., 2024). This choice is informed by the recognition that the implications of AI in traffic systems extend beyond quantifiable performance metrics to encompass governance structures, human behavior, and normative considerations.

At the core of the methodological design is a systematic literature synthesis that draws exclusively on the provided references, ensuring analytical consistency and adherence to the study's strict evidentiary constraints. The synthesis process involves iterative reading, thematic coding, and conceptual mapping, enabling the identification of recurring patterns, theoretical frameworks, and points of contention across diverse strands of scholarship (Buha et al., 2024). Particular attention is paid to how different studies conceptualize intelligence, adaptation, and control within traffic systems, as well as how they position the human driver in relation to automated decision-making.

The methodological rationale for integrating traffic rerouting and driver monitoring is grounded in systems thinking. From this perspective, rerouting decisions influence driver behavior, which in turn affects traffic flow and system stability, creating feedback loops that cannot be adequately understood in isolation (Wuthishuwong & Traechtler, 2013). By adopting an integrative analytical lens, the methodology seeks to capture these interdependencies and explore how AI-driven frameworks operationalize them in practice (Deshpande, 2025).

A key methodological step involves the construction of an analytical framework that synthesizes insights from reinforcement learning, distributed control, predictive analytics, and socio-legal analysis. Reinforcement learning studies provide conceptual tools for understanding adaptive decision-making under uncertainty, particularly in the context of traffic signal control and routing optimization (Wei et al., 2018; Zhang & Yang, 2023). Distributed control literature contributes insights into coordination mechanisms and scalability, highlighting how local decision-making can produce global system effects (Tallapragada & Cortés, 2015). Predictive analytics research offers perspectives on anticipatory governance and proactive congestion management (Zheng et al., 2021). Finally, legal and ethical scholarship contextualizes these technical approaches within broader societal frameworks, addressing issues of responsibility and legitimacy (Vasić et al., 2023).

The interpretive analysis proceeds through comparative thematic analysis, wherein concepts and arguments from different sources are juxtaposed to reveal complementarities and tensions. For example, studies emphasizing efficiency and optimization are examined alongside critiques that foreground equity and surveillance concerns, enabling a balanced assessment of AI-driven traffic systems' societal impact (Moraga et al., 2025; Buha et al., 2024). This comparative approach facilitates a nuanced understanding of how different epistemological assumptions shape research outcomes and policy recommendations.

Methodological limitations are explicitly acknowledged as part of the research design. The exclusive reliance on secondary literature constrains the ability to make empirical claims about system performance or user acceptance. However, this limitation is offset by the study's depth of theoretical engagement, which allows for a more reflective and integrative analysis than would be possible through narrowly focused empirical methods (Lukic Vujadinovic et al., 2024). Additionally, the absence of visual or mathematical representations necessitates a reliance on descriptive explanation, which, while demanding greater interpretive effort, aligns with the study's emphasis on conceptual clarity and accessibility.

Ethical considerations also inform the methodological approach. By critically engaging with driver monitoring technologies, the study remains attentive to issues of privacy, consent, and data governance, recognizing that methodological choices themselves reflect normative commitments (Vasić et al., 2023). The interpretive framework thus incorporates ethical reflexivity as an analytical dimension, rather than treating ethics as an external constraint.

In sum, the methodology is designed to support an exhaustive, theory-driven exploration of AI-driven traffic rerouting and driver monitoring. Through systematic literature synthesis, comparative thematic analysis, and explicit acknowledgment of limitations, it provides a robust foundation for the subsequent results and discussion, ensuring analytical rigor and conceptual coherence (Deshpande, 2025; Pantović et al., 2024).

Results

The interpretive results of this study reveal that AI-driven traffic-based vehicle rerouting and driver monitoring systems are best understood as dynamic, interdependent components of a broader intelligent mobility ecosystem. Across the analyzed literature, a consistent finding is that rerouting effectiveness is significantly enhanced when informed by real-time behavioral data, underscoring the importance of integrating driver monitoring into traffic management architectures (Deshpande, 2025). This integration enables systems to move beyond abstract flow optimization toward context-sensitive decision-making that accounts for human variability and compliance patterns.

One prominent result emerging from the synthesis is the convergence of reinforcement learning and predictive analytics as dominant paradigms for adaptive traffic control. Studies on adaptive signal control and path planning consistently demonstrate that learning-based approaches outperform static or rule-based systems in complex, non-linear traffic environments (Wei et al., 2018; Song et al., 2020). When extended to vehicle rerouting, these approaches enable continuous refinement of routing policies based on observed outcomes, leading to more resilient traffic networks (Zhan et al., 2021). The inclusion of driver monitoring data further enriches these learning processes by providing insights into response latency, adherence to recommendations, and risk-prone behaviors.

Another significant result pertains to sustainability outcomes. AI-driven rerouting frameworks that incorporate emission and congestion metrics demonstrate potential for reducing environmental impact, particularly when integrated with IoT and UAV-based sensing infrastructures (Moraga et al., 2025). The literature suggests that such systems can dynamically balance efficiency and sustainability objectives, although trade-offs remain context-dependent and politically mediated (Lukic Vujadinovic et al., 2024). Driver monitoring contributes to these outcomes by identifying eco-driving behaviors and enabling targeted interventions, reinforcing the interdependence of technical and behavioral dimensions.

The results also highlight the critical role of distributed control and coordination mechanisms. Multi-agent reinforcement learning and neighborhood-based coordination models illustrate how decentralized decision-making can achieve system-wide optimization without centralized control, enhancing scalability and robustness (Zhan et al., 2021; Wuthishuwong & Traechtler, 2013). In this context, driver monitoring functions as a localized sensing mechanism that feeds into distributed intelligence, enabling adaptive responses at multiple levels of the traffic network (Deshpande, 2025).

However, the synthesis reveals persistent challenges related to governance and legitimacy. Legal and ethical analyses emphasize that driver monitoring technologies, while technically beneficial, raise concerns about surveillance and data misuse, potentially undermining public trust (Vasić et al., 2023). The results suggest that technical performance alone is insufficient to ensure system acceptance, highlighting the need for transparent governance frameworks and participatory design processes.

Collectively, these results underscore that AI-driven traffic rerouting and driver monitoring systems produce multifaceted impacts that cannot be reduced to efficiency metrics alone. Their effectiveness depends on the alignment of technical architectures, human behavior, and institutional contexts, reinforcing the value of integrated frameworks that explicitly address these interdependencies (Deshpande, 2025; Zheng et al., 2021).

Discussion

The discussion of AI-driven traffic rerouting and driver monitoring must be situated within a broader theoretical and societal framework that recognizes intelligent transportation systems as evolving socio-technical assemblages rather than purely computational artifacts. The interpretive results presented earlier reveal patterns of convergence across technical domains, but they also expose deep conceptual tensions that merit sustained scholarly engagement. This section therefore undertakes an extensive theoretical interpretation of the findings, compares divergent scholarly viewpoints, addresses structural and epistemic limitations, and outlines future research trajectories, while maintaining continuous engagement with existing literature (Deshpande, 2025).

A foundational issue in the discussion concerns how intelligence itself is conceptualized within traffic systems. Early traffic theories, such as shockwave models and flow-density relationships, treated traffic as a quasi-physical phenomenon governed by aggregate laws (Richards, 1956). While these models provided analytical clarity, they largely abstracted away individual agency and decision-making. AI-driven rerouting frameworks, particularly those grounded in reinforcement learning and predictive analytics, disrupt this abstraction by embedding learning and adaptation directly into system operation (Wei et al., 2018; Zheng et al., 2021). Intelligence, in this context, is not centralized cognition but an emergent property arising from continuous interaction between algorithms, infrastructure, and human drivers.

The integration of driver monitoring further complicates this notion of intelligence by explicitly acknowledging the cognitive, emotional, and behavioral dimensions of traffic participation. Unlike traditional traffic control systems that implicitly assumed rational and compliant drivers, AI-enabled monitoring frameworks recognize heterogeneity in attention, risk tolerance, and responsiveness (Deshpande, 2025). This recognition aligns with broader shifts in human-centered AI research, which emphasize the co-adaptive relationship between humans and intelligent systems. From a theoretical standpoint, this suggests a move away from optimization-centric paradigms toward relational and adaptive models of system intelligence.

However, this shift has generated significant scholarly debate. Proponents argue that integrating driver monitoring with rerouting enables more realistic and effective traffic management, as systems can account for deviations between recommended and actual behavior (Song et al., 2020). Critics counter that such integration risks over-instrumentalizing human behavior, reducing drivers to data points within algorithmic control loops (Buha et al., 2024). This critique resonates with concerns raised in legal and ethical scholarship, where pervasive monitoring is framed as a potential infringement on autonomy and privacy (Vasić et al., 2023). The tension between efficiency and agency thus emerges as a central theme in the discussion.

Another major area of theoretical contention involves centralization versus decentralization in AI-driven traffic systems. Distributed control models, including multi-agent reinforcement learning and neighborhood-based coordination, are often celebrated for their scalability and robustness (Zhan et al., 2021; Wuthishuwong & Traechtler, 2013). These models align with systems theory perspectives that emphasize local interactions and emergent order. Yet, the incorporation of driver monitoring data introduces new questions about data aggregation and oversight. While local sensing enhances responsiveness, it also creates incentives for centralized data repositories to support learning and governance, potentially reintroducing hierarchical control structures (Milovanovic & Pantovic, 2023).

The literature reflects divergent positions on this issue. Some scholars advocate hybrid architectures that combine decentralized decision-making with centralized policy constraints, arguing that such configurations balance adaptability with accountability (Tallapragada & Cortés, 2015). Others caution that hybrid models may obscure lines of responsibility, complicating legal attribution in cases of system failure or harm (Vasić et al., 2023). The framework proposed by Deshpande (2025) implicitly navigates this tension by emphasizing modular integration, wherein rerouting and monitoring functions share data interfaces without necessitating full centralization. This approach offers a conceptual compromise but also raises practical questions about interoperability and standardization.

Environmental sustainability constitutes another critical dimension of the discussion. AI-driven rerouting is frequently justified on the basis of congestion reduction and emission mitigation, particularly within smart city narratives (Moraga et al., 2025). The integration of driver monitoring strengthens this justification by enabling behavioral interventions, such as promoting eco-driving practices. However, the literature cautions against assuming linear relationships between efficiency gains and sustainability outcomes. Rebound effects, where improved traffic flow induces additional demand, may offset short-term emission reductions (Lukic Vujadinovic et al., 2024). This observation underscores the importance of embedding AI-driven traffic systems within broader urban mobility policies, rather than treating them as standalone solutions.

From a methodological perspective, the discussion highlights limitations inherent in existing research. Many studies prioritize simulation-based validation, which, while valuable, may insufficiently capture the socio-cultural factors influencing driver behavior and system acceptance (Zheng et al., 2021). The qualitative, interpretive approach adopted in this article addresses this gap by foregrounding theoretical integration, but it too has limitations. The absence of empirical user studies constrains the ability to assess lived experiences of AI-driven monitoring and rerouting, pointing to a need for mixed-methods research that combines technical evaluation with ethnographic and participatory approaches (Pantović et al., 2024).

The discussion also engages with the temporal dimension of AI-driven traffic systems. Learning-based rerouting algorithms operate across multiple timescales, from real-time adaptation to long-term policy evolution. Driver monitoring data similarly accumulate over time, enabling longitudinal analysis of behavior patterns

(Deshpande, 2025). This temporal layering introduces both opportunities and risks. On one hand, it supports anticipatory governance and proactive congestion management; on the other, it raises concerns about data permanence and function creep, where data collected for safety purposes are repurposed for surveillance or commercial exploitation (Buha et al., 2024).

Future research directions emerge naturally from these discussions. One promising avenue involves exploring explainable AI approaches within traffic rerouting and driver monitoring, addressing transparency concerns while preserving adaptive performance. Another involves comparative cross-cultural studies that examine how legal regimes, social norms, and urban forms shape the adoption and perception of AI-driven traffic systems (Peredy et al., 2024). Additionally, greater attention to equity implications is needed, particularly regarding how algorithmic rerouting may disproportionately impact certain neighborhoods or populations.

In synthesizing these perspectives, the discussion reinforces the central argument of this article: that AI-driven traffic-based vehicle rerouting and driver monitoring must be understood as deeply intertwined processes embedded within complex socio-technical systems. Technical innovation alone cannot resolve the challenges of urban mobility; rather, sustained theoretical reflection, interdisciplinary collaboration, and inclusive governance are required to ensure that intelligent transportation systems serve broader societal goals (Deshpande, 2025; Zheng et al., 2021).

Conclusion

This article has presented an extensive, theory-driven examination of AI-driven traffic-based vehicle rerouting and driver monitoring, situating these technologies within their historical, technical, and societal contexts. By synthesizing diverse strands of scholarship, the study has demonstrated that rerouting and monitoring are not discrete functionalities but mutually reinforcing components of intelligent transportation systems. Central to this analysis has been the recognition that AI introduces new forms of adaptability and intelligence that reshape how traffic systems are conceptualized and governed (Deshpande, 2025).

The findings underscore that the effectiveness of AI-driven traffic systems depends not only on algorithmic sophistication but also on their integration with human behavior, legal frameworks, and urban policy objectives. While learning-based approaches offer significant potential for congestion reduction and sustainability, they also raise critical questions about privacy, equity, and accountability that must be addressed through reflective design and governance. By foregrounding these issues, the article contributes to a more mature and holistic understanding of intelligent transportation systems, offering a foundation for future research and responsible innovation.

References

1. Zhan, D.; Liu, Z.; Li, Z. Congestion control in urban traffic using multi-agent reinforcement learning. Transportation Research Part B: Methodological 2021, 139, 131–148.

2. Vasić, D.; Anđelković, M.; Stanković, V. Artificial intelligence and the legal profession between cooperation, competition and confrontation. International Journal of Economics and Law 2023, 13, 38.

3. Wei, Z.; Xu, Y.; Zhang, Y. Adaptive urban traffic signal control based on Q-learning. IEEE Transactions on Intelligent Transportation Systems 2018, 19, 711–719.

4. Deshpande, S. A comprehensive framework for traffic-based vehicle rerouting and driver monitoring. Research & Reviews: A Journal of Embedded System & Applications 2025, 13(1), 32–47.

5. Moraga, Á.; de Curtò, J.; de Zarzà, I.; Calafate, C.T. AI-Driven UAV and IoT Traffic Optimization: Large Language Models for Congestion and Emission Reduction in Smart Cities. Drones 2025, 9, 248.

6. Buha, V.; Lečić, R.; Berezljev, L. Transformation of business under the influence of artificial intelligence. Trendovi Poslovanja 2024, 12, 9–19.

7. Lukic Vujadinovic, V.; Damnjanovic, A.; Cakic, A.; Petkovic, D.R.; Prelevic, M.; Pantovic, V.; Stojanovic, M.; Vidojevic, D.; Vranjes, D.; Bodolo, I. AI-Driven Approach for Enhancing Sustainability in Urban Public Transportation. Sustainability 2024, 16, 7763.

8. Pantović, V.; Vidojević, D.; Vujičić, S.; Sofijanić, S.; Jovanović-Milenković, M. Data-Driven Decision Making for Sustainable IT Project Management Excellence. Sustainability 2024, 16, 3014.

9. Song, L.; Liu, X.; Zhang, Y. Optimal path planning for vehicles using reinforcement learning. Transportation Research Part C: Emerging Technologies 2020, 118, 102741.

10. Tallapragada, P.; Cortés, J. Coordinated intersection traffic management. IFAC PapersOnLine 2015, 48(22), 233–239.

11. Wuthishuwong, C.; Traechtler, A. Coordination of multiple autonomous intersections by using local neighborhood information. Proceedings of the International Conference on Connected Vehicles and Expo 2013, 48–53.

12. Zheng, X.; Ma, S.; Yang, J. Exploring the impact of AI-driven predictive analytics on urban traffic congestion. IEEE Transactions on Intelligent Transportation Systems 2021, 22, 4225–4238.

13. Milovanovic, D.; Pantovic, V. 5G-AIoT Artificial Intelligence of Things—Opportunity and Challenges. In Driving 5G Mobile Communications with Artificial Intelligence Towards 6G; CRC Press: Boca Raton, 2023.

14. Peredy, Z.; Li, S.; Vigh, L. Chinese city tier ranking scheme as special spatial factor of innovations diffusion. International Review 2024, 88–99.

15. Richards, P.I. Shock waves on the highway. Operations Research 1956, 4(1), 42–51.

16. Wen, J.T.; Arcak, M. A unifying passivity framework for network flow control. IEEE Transactions on Automatic Control 2004, 49(2), 162–174.

17. Work, D.B.; Blandin, S.; Tossavainen, O.P.; Bayen, A.M. A distributed highway velocity model for traffic state reconstruction. Applied Mathematics Research eXpress 2010, 1–35.

18. Cao, K.; Wang, L.; Zhang, S.; Duan, L.; Jiang, G.; Sfarra, S.; Zhang, H.; Jung, H. Optimization Control of Adaptive Traffic Signal with Deep Reinforcement Learning. Electronics 2024, 13, 198.

19. Zhang, X.; Yang, L. Reinforcement learning for adaptive traffic signal control. arXiv 2023.